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VETERINARY MEDICINE

DECEMBER CONTENTS 1949

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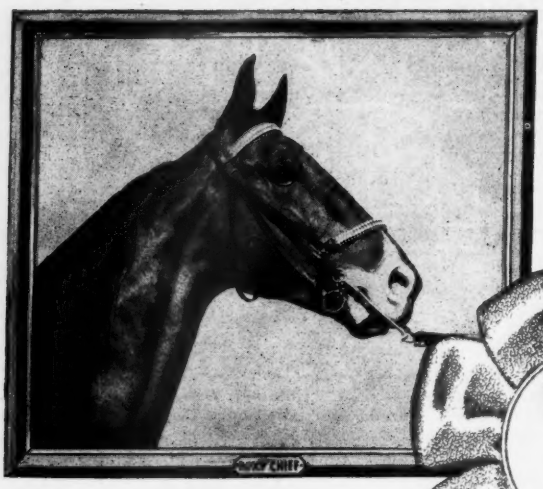

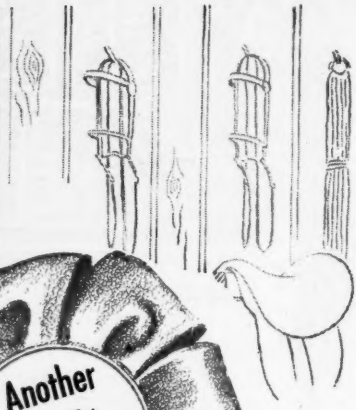

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Bovine Tuberculosis Eradication

The first objective of bovine tuberculosis eradication, a modified accredited status, has been attained. The B.A.I. now faces the problem of public inertia. However, as long as a core of infection is present in a few problem herds where difficulty has been experienced in identifying nonreacting spreader cows, a potential danger exists of losing ground gained in complete eradication of this disease in our cattle.

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Increased Vaccination for Brucellosis

According to release of the Agricultural Research Administration, U.S.D.A., 5,671,347 cattle were blood-tested for brucellosis and 1,573,128 calves were vaccinated with Brucella vaccine strain 19, during the fiscal year ending June 30, 1949.

The average national percentage of reactors found on the blood test was 4%, compared with 4.3% in 1948 and 11.5% in 1935.

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Veterinary Officers of the newly created Air Force Medical Service include Colonel Wayne O. Kester, (K.S.C. '31), assigned as Chief of the Veterinary Service, U. S. Air Force Medical Service, and Major Robert R. Miller, Assistant Chief.

New Outbreak of Foot-and-Mouth Disease in Mexico

A new outbreak of foot-and-mouth disease in Mexico within the quarantine area was announced October 24, 1949, by the Joint Mexican-United States Commission for the eradication of the disease. This is the first evidence of active infection of foot-and-mouth disease since July, and was discovered in the Minicipio of Chicoloapan, State of Mexico, near the center of the quarantine zone.

Although the appearance of the disease occurred in animals which had been vaccinated for the second time, it is felt by the director and co-director of the Commission, that there is no cause for alarm. The inspection teams discovered the infection immediately, and animals were disposed of, premises disinfected, and all other susceptible animals in the immediate area revaccinated. Strict quarantine was placed around the area and it was believed the outbreak would be localized.

Through constant inspection and quick action, the Commission expects to wipe out these pockets of infection wherever they break out.

Thousands of animals in areas adjacent to the outbreak have been inspected with no trace of infection found, and all are being revaccinated and closely watched.

Free-Martins in Triplet Calves

A Pennsylvania practitioner has inquired if two heifer calves born as two of triplets with a bull are likely to be free-martins. The calves are out of a valuable cow by a well-bred sire and the owner wished to raise the heifers as herd replacements if there was a good chance they would prove fertile.

On the surface, it would appear that the triple calving of both sexes would not differ from the experience with twins. In such cases, anastomosis of the chorionic blood vessels is the rule and the female is most often barren. No references as to heifers in triplet birth with a bull were found on a review of the literature. Furthermore, there appeared to be a likely possibility that one or both of these heifers would develop as sexual normals. Unless hemotological studies of the heifer calves revealed evidence to indicate intrauterine vascular anastomosis, no positive answer to the question would be possible until the animals were sufficiently mature for a thorough examination of their reproductive tracts per rectum to determine anatomical normalcy.

When referred to him, Dr. W. G. Venzke, College of Veterinary Medicine, Ohio State University, Columbus, made the following comments:

"In cattle, the developing fetal membranes of twins usually grow together where they come in contact. If enough of the blood vessels on the two sets of membranes grow together, the blood of the twins mingles and some of that from each twin actually flows in the blood vessels of the other. This does no damage when both are males or both are females; but, when one is a male and the other is a female, the androgenic or male hormone secreted by the male testis develops first and exerts enough influence upon the female to inhibit proper development of the reproductive tract. Should this occur with one or both of the heifer calves in the case under discussion they would develop as free-martins. The extent to which the female genital tract is altered varies greatly, presumably depending upon how early and completely the blood vessels fuse.

"Occasionally the membranes do not fuse at all, or at least the blood vessels on them do not grow together, and male and female twins or triplets born are quite normal.

"According to data from 283 females born twin to a bull calf, only about one in 12 is fertile.

"The bull is not affected, presumably because his sex organs start to differentiate earlier and never permit those of the female to reach the stage where they can hamper the male's development.

"The free-martin condition is very rare in animals other than cattle. Why the membranes of twins should so frequently fuse in cattle and so rarely in other animals is not clear.

"The proportion of twin births in cattle is generally low, being something like one twin birth among every 200 births in the beef breeds and one twin birth among every 50 to 60 births in dairy breeds. Approximately .03% of all births in cattle are triplets.

"Many of the free-martins show evidence (especially a distinctly enlarged clitoris) of abnormality, even at birth. On the other hand, if the heifer appears absolutely normal at birth, chances of her being fertile are higher than the general average of about one in 12.

"Hemotologists are now working on the problem of the accurate determination of fertility in multiple births by blood testing the calves at an early age. The principle upon which the test is based assumes that the cause of the free-martin condition results from chorionic vessel fusion. As noted above when this fusion between a heifer and bull calf occurs the androgenic or male hormone inhibits the proper development of the female genital tract and at the same time there is mixing of both bloods. Therefore, if this is true the stem cells of the erthyrocytes should be the same and when the cellular antigens are determined in the heifer and bull calf twins they should be similar. If they are similar, the heifer calf would definitely be a free-martin. If the blood cellular antigens are found in the case of twins to be different in the male and female calf, it seems logical to assume no fusion of the chorionic vessels occurred, no mixing of the bloods, and the androgenic or male hormone could not inhibit development of the female reproductive system. In this case the female should be fertile.

"If the owner of these triplets is interested in having the blood typed I would suggest that he write Dr. L. C. Ferguson, Department of Bacteriology, Ohio State University, Columbus. As you can see from the above comment, the test would require a blood sample from each of the three calves. If the blood cellular antigens of the two heifers are different than those of the bull, the chance of the two heifers being fertile is fairly good. However, if the cellular antigens of all three are similar, the chance of the two heifer calves being fertile is very remote."

Veterinary Division in Association of Land Grant Colleges

The first session of the newly created Division of Veterinary Medicine in the Association of Land-Grant Colleges and Universities met in Kansas City on October 24-27, 1949.

Dean W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, served as chairman of the division. Activities included attendance at general session on each of the four days of the meeting at which time nationally prominent speakers, including Secretary of Agriculture, the Hon. Charles F. Brannan, addressed all registrants. Division meetings allowed opportunity for the discussion of some pressing problems peculiar to veterinary education. All of the veterinary schools but one (Pennsylvania) are located at educational institutions that have developed under the Morrill Act, signed by President Abraham Lincoln in 1862.

Dean H. D. Bergman, Division of Veterinary Medicine at Iowa State College, was elected chairman of the Veterinary Medicine Division of the Association. Dean C S. Bryan, Division of Veterinary Medicine at Michigan State College, was elected secretary, and Dean W. A. Hagan, vice-chairman.

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New Health Plan

Dr. E. R. Price of the United States public health service stated recently that a plan is in progress under federal sponsorship to have on the health department staffs of each state and every major city a public health veterinarian.

Doctor Price, in charge of field investigation of encephalomyelitis for the health service at Kansas City, spoke before a meeting of the U. S. Department of Agriculture Club.

The new departments would be under the division of epidemiology of the public health service and the program would co-ordinate state and city departments with the federal unit. Veterinarians would aid in promoting new programs to prevent and control diseases common to both human and animals and to help promote existing programs.

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Oil Wells Source of Our Iodine Supply

According to *Industrial and Engineering Chemistry,* iodine is obtained from a brine that comes up with oil. Nearly one-half of the 1,500,000 pounds of iodine used annually in America now is obtained from oil-well brine. It is reported that our entire requirements are possible from domestic sources.

Horns Are Costly Decorations

Illustrated is a portion of the dressed carcasses of 204 head of cattle on which tipped-horn damage amounted to a considerable loss. Of the 204 head, 161 of these carcasses were damaged to the extent that loins, ribs and chucks had to be trimmed on account of bruising. Besides the actual loss of 7140 pounds of bruised meat that were condemned for human consumption, cuts were reduced in value.

This loss of 35 pounds of beef per head represented a forfeit of $12.25 per animal, or

—Courtesy Ray L. Cuff, Regional Manager, National Live Stock Loss Prevention Board, Kansas City.

$2500 for the total lot, at a 35c-per-pound cost for carcass beef.

Cattle growers in some areas attempt to lessen horn damage by sawing off the tips of the horn down to the sensitive tissue. This leaves a horn with a knife-like edge that will not puncture the skin but does cause widespread bruising when cattle are crowded in cars and stock pens. Dealers in both feeder and fat stock usually dock such tipped-horned cattle at least 25c per cwt. This preventable dock of between $50 to $60 per carload is justifiable and the cattle grower is paying the bruise bill.

It is reported that approximately 20% of cattle slaughtered during 1948 were horned or tipped-horned.

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English is now the most widely used language for scientific articles, pushing German and French into the background. Fifty-seven per cent of all scientific articles are now published in English.

Testosterone in Veterinary Medicine

Testosterone is indicated in the treatment of testicular deficiency, impotence, and cryptorchidism when the nondescent of the testicle is due to an androgenic deficiency and no evidence of mechanical obstruction exists. Following testosterone injections a significant nitrogen retention has been demonstrated; therefore, it is also indicated in debilitating diseases or conditions in which quick restoration of nitrogen balance with deposition of body protein is desired.

Testosterone possesses all the masculinizing properties attributable to the male sex hormone and is indicated in male animals wherever there exists a deficiency of this hormone.

Engle and Macbrayer (*Jour. Amer. Vet. Med. Assn.*, 97:158, 1940) have reported favorable results with testosterone therapy in treating impotence in dogs. They employed the following dosage: For dogs weighing over 30 pounds, 25mg initially, followed by 10mg doses on each of two succeeding days; for dogs under that weight, 10mg daily was considered adequate. They concluded that if no improvement in breeding potency occurs 48 hours following the fourth daily injection, one should expect that a male sex hormone deficiency is not the cause of the impotency.

The subcutaneous implantation of 225mg pellets of testosterone in racing geldings apparently improved the speed and endurance of some of the animals so treated. Limited studies indicate that this dosage every two months will bring about the desired results, according to Kearns, (*Jour. Amer. Vet. Med. Assn.*, 100: 197, 1942). Intramuscular injections of 50mg every other day for five doses has the same effect, the animals showing stallion-like behavior after the third dose. U. S. Dispensatory, 24th Edition, Lippincott, 1947, Part IV, page 1767 V). However, it is impossible to state just how much the racing condition of horses so treated is improved since controlled experiments are lacking.

Testosterone therapy has been recommended for functional disturbance of the male reproductive organs in small animals with the following symptoms: impotence, infantilism, obesity, premature senility, chronic eczema of old dogs, muscular weakness of old dogs, and sterility, (Kirk, Index of Treatment, Williams & Wilkins Co. 1948, p. 100).

Beckman (*Veterinary Medicine* 40:20, 1945) suggests administering testicular hormone to bitches with multiple, mammary tumors. Apparently the results in such cases can only be classed as palliative in most instances.

Durrell, (*Canad. Jour. Comp. Med.*, p. 290, Oct., 1947.) reports concerning his observations on sterility in bulls. The following chart lists his results with testosterone therapy:

According to this report, a dosage of 100mg given intramuscularly once a week for three weeks appears to be a favorable treatment schedule.

No. of Bull	Breed	Age	History	Dose	Result
1	Hol.	15 mo.	Impotency	100mg weekly for three weeks	Satisfactory; excessive sexual desire after third week.
2	Ayr.	20 mo.	Impotency	"	Fair improvement
3	Hol.	18 mo.	Impotentia coeundi	"	Definite improvement after second week; subsequently normal.
4	Jer.	10 yr.	Impotency	100mg (not repeated)	Temporary improvement

The following dosage schedule of testosterone proprionate (aqueous solution)* may be considered as an average amount but may vary somewhat according to the size and condition of the animal patient.

For impotency in dogs. Dogs under 30 lb. body weight—10mg daily for four days. Dogs under 30 lb. body weight—25mg initially, followed by 10mg on each of two succeeding days.

In cryptorchidism in dogs. Dogs up to 75 lb. body weight—15mg three times a week for a period of eight weeks.

In all other indications in small animals, 5-10mg on alternate days for a period not to exceed six weeks, continued only according to clinical judgment.

Impotency in bulls. 100mg once a week for three weeks.

Impotency in other large animals. 50mg for four consecutive days with breeding on the fifth or sixth day.—J. LAVERE DAVIDSON

New Form of Hog Cholera Discovered by U.S.D.A. Veterinarians

A form of hog-cholera virus never before recognized may have been responsible for recent swine losses in the Midwest, according to findings of U.S.D.A. veterinarians, as reported in an Agriculture Research Administration news release for November 12, 1949.

A very significant finding is that pigs which had been immunized with regular serum and virus were found to be completely resistant to the virus containing this variant. This finding indicates that this variant is not too widely different from regular virus.

There was no evidence of extraneous viruses or bacteria in any of the materials tested. A careful review of the records of production and testing of both serum and virus under study showed no deviation from that regularly followed and required by Bureau regulations.

Bureau veterinarians point out that the phenomenon of variants within types has been recognized for a number of years in other virus diseases. The conditions under which variants are produced are not now understood. Studies on the subject are still in progress and will be continued.

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An Additional Residual Insecticide for Fly Control

Another insecticide for use as a residual spray for fly control in dairy barns is recommended by entomologists of the United States Department of Agriculture. It is the essentially pure gamma isomer of benzene hexachloride, now known by the common name—lindane.

Until more is known, the Bureau of Entomology and Plant Quarantine does not recommend that lindane be used on dairy cattle for insect control nor that it be applied to forage that is to be fed to dairy cattle or animals being finished for slaughter.

Lindane consists of at least 99% gamma isomer of benzene hexachloride and contains only traces of the other isomers. This highly refined material is practically free of objectionable musty odor. Its toxicity from a chronic standpoint is considerably less than that of technical benzene hexachloride.

Oklahoma A. & M. Student Society to Aid Injured Members

The spontaneous action of the veterinary student group of Oklahoma A. & M. College at Stillwater, aside from being commendable, demonstrates the virtues of unselfishness of this organization of young men.

At 4:00 a.m. on the morning of October 22, 1949, an explosion occurred in a building in which veterinary students were putting the finishing touches on their float for the homecoming parade. All members of the society had donated work on the elaborately decorated entry, working in shifts to assure completion in time for display. The explosion severely burned two students. Raymond Henry received second and third degree burns on hands, arms, hips, and legs. C. M. Wilson received second degree burns on the hands and third degree burns on the left leg. At this writing both are doing well, though hospitalized. It is estimated the confinement period will extend to late December if present improvement continues.

The Oklahoma A. & M. Student Veterinary Society unanimously elected to assume the financial responsibility for the care of these two students. The means by which this will be accomplished is now under discussion. As a group they are assisting the injured men to maintain their scholastic position by making sound recordings of all lectures, showing films presented to the class, and taking material and equipment for study to the bedsides for their use. Individual students have made blood donations for direct transfusions and to replace blood and plasma used in treatment.

Because they suffered injuries in line of duty —devotion to a cause of interest to the group— fellow students of Raymond Henry and C. M. Wilson have resolved to see 'em through, in full realization that their efforts fall far short of compensation for the suffering and loss of the opportunities of these classmates. This action will impose an illtimed burden on all, but the effort reflects the character of our student veterinarians.

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Estrus Cycle of Dairy Cattle

Asdell, *et al.*, (*Cornell Vet.* 39:4, 389-402, 1949) report on cycle length of a group of grade dairy cows. Some 167 cycles were studied. The interval of time for estrual cyclic changes most frequently observed was 20 days. Ninety per cent were within the 18- to 25-day range.

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Temper is likened to the kettle; the emptier it is, the quicker it boils.

Benign Hyperplasia of the Canine Prostate

Prostatic enlargements in the dog, commonly observed by practitioners, is reported by Logan M. Julian, University of California (Pathological Basis for Hormone Therapy of Abnormalities of the Canine Prostate. *The California Vet.*, Sept.-Oct., 1949), to be in most instances a benign hyperplasia of the gland. Histologically, the most striking change involves the glandular epithelium which appears stratified.

The importance of the enlarged gland as a direct cause of ill health has been questioned. Urethral stenosis and chronic constipation by mechanical pressure on the urethra and rectum are reported as direct results of prostatic hypertrophy.

The author states that this common enlargement appears to be associated with excessive androgen stimulation. Microscopical anatomy of naturally occurring cases resembles that produced by experimental injections of androgens. It follows, therefore, that the use of estrogens in the treatment of prostatic hypertrophy has basis in experimental studies of physiology and pathology. Estrogens are contraindicated in dogs suffering from an enlarged prostate associated with testicular neoplasms. Castration in these animals, removing all neoplastic tissue, is followed by reduction in the size of the prostate gland and the relief of symptoms.

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Money Grant for Toxicity Studies

First payment of $12,500 on a $23,600 grant from Julius Hyman and Company, Denver, has been received for research at the Kansas State College Experiment Station, according to R. I. Throckmorton, station director.

The money is to be used to study the effect of poisonous chemicals on insects.

The K-State department of entomology and School of Veterinary Medicine will coöperate through the Kansas State Agricultural Experiment Station in testing the insecticidal compounds. Rats, rabbits, cattle and sheep will be used in the studies. The entomology department will test the killing effect of the compounds on common insect pests.

The Lippizans, famous Austrian horses and, next to the pure Arabs, said to be the oldest established breed of horses in the world, are shown drawing the imperial carriage of former Emperor of Austria-Hungary, Franz-Joseph. This four-in-hand hitch was exhibited at the American Royal Horse Show in Kansas City, Mo., by Mr. John W. Nolan of Garden City, Kansas, owner of these famous horses. The present owner acquired the animals at public sale from the U. S. Army. They were confiscated by General Patton's Third Army during World War II and shipped to the United States as war booty. The striking beauty and superior quality of these superb animals and the rhythm and balance shown in motion hold the attention of all horsemen.

The Utilization of Despecific Bovine Serum for Emergency Transfusions in Veterinary Medicine*

Blood transfusion in human medicine made considerable progress during the last war. Not only has preserved blood been generally used but, as American authors have called it, "substitute blood" was developed. In order to limit ourselves to the domain of biological products, it has been proved that in many circumstances serum or plasma can replace whole blood. And in the United States, laboratories have been equipped for production of so-called dry plasma. However, the need for such products has become so great—three million liters in the U.S.A.—that the question immediately rises whether the number of voluntary donors will be sufficient to maintain the supply. A great deal of work has gone into research on products of replacement derived from animals, especially despecific serum from cattle. Among these research projects we mention here only those of Miss Cordier and her colleagues because to our knowledge this is the only French work in our line and it will illustrate collaboration of human and veterinary medicine. The research studies we have undertaken involve both human serum and bovine serum made nontoxic by formol and heat. We have kept in mind the problem of blood transfusion in veterinary practice.

It is quite evident that emergency transfusions in animals are not as imperative as in human subjects. The indications are interesting in that they are applicable only to determined cases. It is no less interesting to verify if the despecific serum of cattle can be utilized on dogs as a blood substitute.

Despecification of Bovine Serum

After different trials, we have despecified the serum of young cattle, bled aseptically by the technic of Edward as it has been used in Tunisia by Miss Cordier. She was not satisfied with preparing only a despecific serum, but made experiments in 100 human cases with less than three incidents. This approximates the normal percentage of serious reactions following transfusions with preserved blood.

The bovine serum prepared according to a classic technic is processed with formol and ammonia *aux taux*, using, respectively 0.2 and 0.35 per 100. This is heated in a water bath at 74°C. for 30 minutes. The product so obtained is tested for sterility by both aerobe and anaerobe cultures, together with intravenous injections of large doses into a rabbit and a dog to demonstrate freedom from toxicity.

Experiments With Dogs

A dog was anesthetized with chloral. At this time a tracing register of arterial blood pressure was made with Ludwig's kymograph and a respiration tracing with a Guinard pneumograph. Under this double control, a loss of blood by hemorrhage of the arteries was continued until a notable drop of arterial pressure was obtained. One may see the circulatory and respiratory modifications registered on the charts. One also notes on these charts the influence of intravenous injections of the despecific serum on arterial pressure observing that it returns rapidly to its initial level. These results are so conclusive that it seems unnecessary to add more but, what should be underlined is the lasting effect of the transfusions. As it is always possible to establish the arterial pressure of a dog which has been artificially bled by an injection of physiological serum, it is much more difficult to obtain definite results. But the despecific serum seems able to give such results, as the animals that are bled and given such transfusions will rapidly recuperate all of their vitality.

Therapeutic Indications

The experimental results we have outlined authorize us to recommend the despecific serum of cattle for urgent transfusions in cases of accidents whether on the street or during hunting. If the veterinarian has at his disposal a vial of despecific serum equipped with the auto-injection he can, in a few seconds, and in a most elegant way, replace without danger the full amount of blood that has been lost. And one knows, since the memorable experience of the Lyonaise scientist, S. Arloing, that in hemorrhage the diminution of the amount of blood is at least as dangerous as the loss of blood cells.

With other species, the despecific serum can be utilized not only for the same use but also as a diluent of numerous substances. Among these we think especially of penicillin, arsphenamine, calcium salts, pigments, etc.

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Incidence of brucellosis in farm animals in Poland is reported to be from 30 to 100%.—*Medycyna Weterynoryjna*, 5:8 (September), 1949.

*Translated from *Bourgelat*, 21:4 (new series), 1949, by Jeannette Zletlow and A. H. Quin.

Comments Upon Animal Health Factors

By R. R. DYKSTRA, D.V.M., Manhattan, Kansas

A communication was received from a worried dairy operator in which he raised two questions, *i.e.;* (1) will spraying with DDT cause abortion and (2) is DDT excreted in the milk of sprayed animals. The first question was answered negatively, and the dairyman advised to have his cows tested for brucellosis. The answer to the second question was also negative because the amount of DDT excreted in the milk is negligible provided that an approved strength of an aqueous suspension of the DDT is used. However a warning was issued against oil solutions of DDT, and also against its use as a spray in dairies or on the cows at the time of milking, and at no time is it to be used on the feed of cattle. The facts seem to be that if a cow inhales or ingests sufficient amounts of DDT it tends to accumulate in the fatty tissues of the exposed animal, and to be excreted in the fat of the milk. The statement that hyperkeratosis (X-disease) of cattle is the result of the extensive use of DDT is without foundation.

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Careful studies indicate that in about 15% of the equine blood transfusions there are unfavorable reactions because of varying blood groups—six have been recognized. Because of practical difficulties associated with the differentiation of the groups, most practitioners regard it as a justifiable risk, and, therefore, the groups are disregarded in blood transfusion in the equine. A saline suspension of red blood cells is said to be as good for transfusion purposes without the occasional harmful whole-blood reactions.

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The agglutination test for trichomoniasis is generally looked upon as a herd test rather than the detection of individual members of the herd. In this it seems to resemble the agglutination test for brucellosis in swine. It seems that the trichomoniasis test shows reactions above the normal non-specific level and below the positive level.

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Intravenous chloral hydrate hypnosis in swine during cesarean section is not advisable because the fetuses are so deeply affected that they do not recover from the effects of the hypnotic, and as a result are dead when delivered or die shortly thereafter.

In regard to the vaccination of swine to immunize them against erysipelas, it is worthwhile to quote the following from a report made by Peterman *et al.,* to the 52nd Annual Meeting of the U. S. Livestock Sanitary Association:

1. "The vaccine is safe to use."
2. "Vaccinated animals do not seed down the premises nor do they transmit the disease to non-vaccinated animals."
3. "No harmful results follow the vaccination of pregnant sows."
4. "No bad effects follow the simultaneous use of hog cholera serum and virus and swine erysipelas culture and serum."
5. "Hog cholera can be produced at the time of vaccination against erysipelas if the equipment is contaminated with the hog cholera virus. It is therefore especially important to have all vaccination equipment brought to the farm free from virus contamination."

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Research workers at Michigan State College report that pigs at weaning time placed on a basal ration (corn 77%, soybean oil meal 20%, and a complex mineral mixture 3%, also the usual A, B, and D vitamins) with 0.5% vitamin B_{12} concentrate added, had at the end of seven weeks gained 17 pounds more than those on a comparable ration but without the vitamin B_{12}. The uncertainty, according to the authors, seems to be that vitamin B_{12} concentrate may contain impurities that influenced the test, though in the hypothesis that was advanced the vitamin B_{12} is given the credit for the increased gain.

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When a cow's teat fills with milk, and it cannot be forced out, the obstruction is in the streak canal. When the teat does not fill, the obstruction is at the junction of the teat and quarter either in the form of quite extensive fibrous thickening, this is usually not responsive to treatment, or as a membranous structure that effectively occludes the canal. When surgical interference is practiced for these conditions, do not immediately remove all the milk—rather milk the animal incompletely and frequently as this will have a tendency to prevent the divided tissues from reuniting.

Allergy and Antihistamine Therapy In Veterinary Practice*

By G. W. RAWSON, D.V.M.
Summit, New Jersey

ALLERGIC CONDITIONS, at least in human subjects, have been repeatedly described in medical writings from the earliest times. Bronchial asthma was known as far back as the Greek and Roman period, although it is only within the last few years that the cause and nature of allergy and anaphylactic phenomena have been well understood and measures of control put to practical use. The history of the unfolding of knowledge concerning allergy, as well as the development of modern antiallergic compounds, is quite interesting, but we veterinarians are generally more concerned about practical results than with medical history or theories. Allergic and anaphylactic reactions, and the now generally accepted theory of the development of symptoms of these conditions, are of sufficient importance to discuss in detail, so a better understanding of the principles involved will enable us to realize what takes place, to recognize symptoms to better advantage and to apply rational therapeutic measures.

As most of us are aware, both allergy and anaphylaxis are believed to be the result of an antigen-antibody reaction in animals previously sensitized by contact with, or exposure to, a specific antigen. We do not know why certain individuals become sensitized to allergenic substances, while others show little if any reaction to the same antigens. If we knew, it might be possible to prevent allergy rather than to treat it symptomatically.

We know that certain substances, particularly those belonging to the vegetable and animal kingdoms, are capable of sensitizing cells composing the epithelium and other body tissues, and that the symptomatology is not manifested in the same manner in different species of animals. For example, we know that in rabbits, the lungs chiefly are affected, while in dogs liver disorders of allergic origin are common. Allergic reactions in man may exhibit themselves in a variety of ways—in the form of hay fever, asthma, and cutaneous reactions.

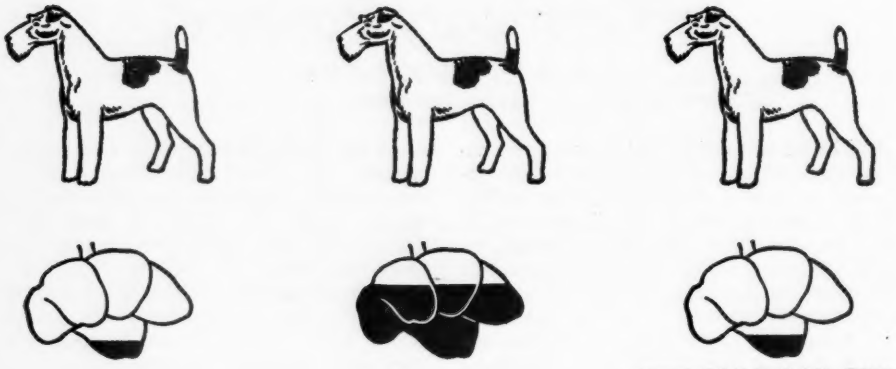
Some investigators have attempted to break down the symptomatology into the categories of respiratory or asthmatic, dermal or cutaneous, mental or emotional, and a physical hypersensitive type, such as may be produced by heat, cold, light (photosensitization), and drugs. No sharp line of demarcation can be drawn in all cases because the symptoms may be confused and frequently difficult to differentiate from nonallergic conditions. This applies more particularly to allergy in animals because the veterinarian has not learned to recognize this condition as well as the physician. More recent investigations indicate that the principal symptoms seen are produced by a release of histamine or histamine-like substances into the blood stream or other tissues of the body. The nature, degree, and extent of the symptoms are probably dependent on the amount of histamine released. While the histamine theory is not entirely sufficient in itself to explain fully the phenomena of allergic reactions under various and sundry conditions, the role of histamine or histamine-like substances has been accepted by many investigators. On the basis of this discovery, a number of effective antihistamine drugs or compounds have been developed. The proved effectiveness of such compounds in controlling various types of allergic reactions under clinical conditions in human practice, is very good evidence that the histamine theory is correct, or at least sufficiently practical to obtain highly beneficial results in both man and animals when employed under proper and suitable conditions.

What Is Histamine?

It might be advisable to say a few words about histamine in order to get a better conception of how it works and how it can be influenced or controlled. Histamine or beta-imidazolyl ethylamine is the degradation product of the alpha amino acid, histidine, formed in the course of protein fragmentation. Ackerman in 1910 proved that certain putrefactive bacteria produce histamine by the decarboxylization of histidine and when absorbed by the intestine, cause autointoxication in man. It is advisable for veterinarians to keep this fact in mind because it possibly has some bearing on

*Presented at the Annual Meeting of the Veterinary Medical Association of New Jersey, Trenton, N. J., Feb. 3, 1949.

HISTAMINE CONTENT OF LIVER OF DOG



—Courtesy of G. D. Searle & Co., Chicago

Normal animal
15.9mg per kg
of tissue

Sensitized animal
70mg per kg of tissue

Shocked animal
18mg per kg
of tissue

Histamine normally found in small amounts in various tissues of the body, can be stored in the liver of sensitized animals in relatively large amounts. It is released, apparently, during antigen-antibody reactions, in what some authorities refer to as a trigger-like reaction causing manifestations of shock.

the cause, or at least the symptomatology of laminitis and colic in horses, as well as tympanites or bloat, toxemia, and various abnormal conditions in cattle, sheep, and other herbivorous animals. Histamine is found normally in relatively small amounts in various tissues of the body, particularly in the white blood cells, the mucosa of the small intestine, and the skin. However, it can be stored in the liver of sensitized animals in relatively large amounts. Histamine is apparently released during antigen-antibody reactions. Some authorities refer to this as a trigger-like reaction and feel that the released histamine affects what are known as "target organs." For instance, histamine causes contraction of smooth muscles, which accounts for suffocation during anaphylactic reactions in guinea pigs due to contraction of the bronchi. It also affects intestinal and uterine smooth muscle; hence the development of diarrhea, colic, tenseness, etc. The capillaries are also affected chiefly by being dilated and by their permeability being increased so that plasma and lymph escape into the tissues, causing localized edema, etc. Cutaneous reactions can be seen to good advantage in allergic contact dermatitis or following the experimental intracutaneous injection of specific antigens in sensitized patients. Changes in hemoconcentration and blood coagulability, leucopenia and increased sedimentation rate are reported to follow the release of histamine.

The glands of external secretion are affected and lacrimation and salivation (particularly in cats) may occur. The lungs and digestive glands may also be affected by increased secretory activity. Pain or sensitivity resulting from the effects of histamine on cutaneous nerve endings in the skin may be exhibited.

In sensitized guinea pigs, the histamine content of the lungs is greatly increased, whereas in shocked animals it is decreased approximately 20% from normal. A similar phenomenon occurs in dogs.

Antiallergic or Antihistamine Therapy

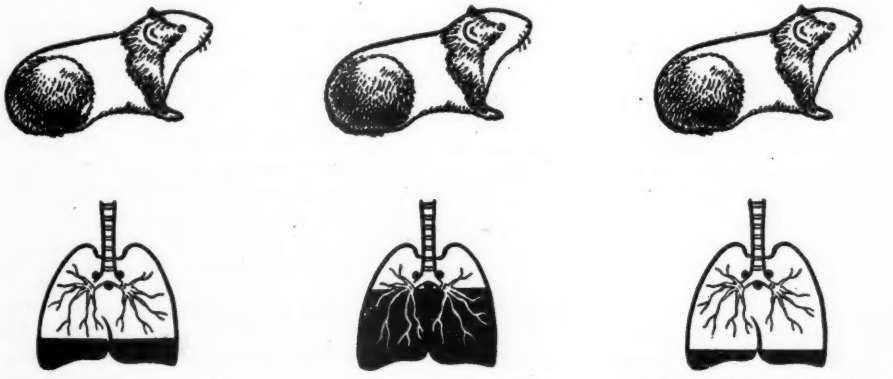
Results following the use of antiallergic drugs in veterinary medicine have not been studied as extensively as in human practice. This is particularly true in cases of allergy and anaphylactic shock in large animals. Several new, practical, and effective therapeutic agents are now on the market for human use, but so far little has been published in regard to their clinical value for the treatment of allergic conditions in domestic animals. However, as the writer's experience has been almost entirely with pyribenzamine (N,N-dimethyl-N'-benzyl - N' - (alpha-pyridyl) ethylenediamine, monohydrochloride), most of the information

included in this article is based on this particular product. Most of the antihistamine drugs now available have similar action and all are intended to inhibit or neutralize the effects of histamine in the system. In human practice there seem to be differences in individual toleration and the development of side reactions. One compound may produce beneficial results without any unpleasant symptoms in one individual, whereas in another the opposite may be the case. According to the published observations of Bernstein, Rose, and Feinberg, the toxic effects following the use of three antihistaminic compounds in human practice are as follows:—benadryl 50%; neoantergan 27%, and pyribenzamine 23%. So far as I know, very little has been published on the side effects or toxic action of antihistaminic drugs in domestic animals. Taylor published an article on the subject (*N. Amer. Vet.*, June, 1947), in which he described reactions in a limited number of dogs. Reports following the use of pyribenzamine in dogs indicate that side effects are relatively infrequent and when they do occur are usually characterized in a small percentage of cases by nausea, vomiting, and drowsiness. It might be advisable to say at this point that pyribenzamine (and probably other similar compounds) should not be given to dogs intravenously unless injected very slowly and in relatively low dosage, because it may result in acute temporary hypertension. However, in the case of large animals such as horses and cattle, the intravenous route seems to be the most practical method of administration.

From results reported by veterinarians in practice, pyribenzamine and other antihistamine compounds have produced very good results in various types of allergy in dogs. As yet, too little is known about the effects in cats or other small animals.

The greatest benefits in dogs have been obtained in some skin diseases associated with allergy such as summer itch, dermatitis, edema, and eczema. Antihistamine therapy has also proved valuable in the relief of asthmatic attacks, and in attacks of coughing and sneezing apparently due to sensitization to pollen, dust, animal matter, etc. Another important use of antiallergic or antihistaminic drugs in dogs is to prevent or lessen anaphylactic shock following the injection of heterogenous sera, bacterins, etc., in animals previously sensitized to such substances. The same thing may also apply to large animals, particularly cattle previously treated with anthrax antiserum prepared from horses. In this latter case, there has been insufficient information to prove definitely the benefits or limitations of this form of preventive anaphylactic treatment.

HISTAMINE CONTENT OF LUNGS OF GUINEA PIG



—Courtesy of G. D. Searle & Co., Chicago

Normal animal
14.2mg per kg
of tissue

Sensitized animal
73mg per kg
of tissue

Shocked animal
3mg per kg
of tissue

Histamine causes contraction of smooth muscles, which accounts for suffocation during anaphylactic reactions in guinea pigs, due to contraction of the bronchi.

Considerations in Regard to the Administration and Dosage of Pyribenzamine

It should not be assumed that drugs in either human or veterinary medicine cure allergic conditions. Little is known about the prevention of sensitization, although the injection of specific antigenic substances, in gradually increasing amounts, has met with success in human practice. The beneficial results of antiallergic drugs in veterinary practice are due to the control of symptoms and it may be necessary to continue treatment as long as animals are exposed to substances to which they have become sensitized. If the particular antigen responsible is known, symptoms of allergy can usually be avoided by eliminating such material from the diet or from contact. However, in the case of pollen, dust, fungi, vegetation, insect bites, etc., it is not easy to detect or to avoid the offending agent. In such cases, relief can usually be obtained with pyribenzamine or other antiallergic agents which should be administered as long as necessary. All allergic patients should be removed from contact with antigenic substances whenever possible. This is seldom practical or possible with farm animals, as veterinarians know only too well.

The differentiation between allergic and nonallergic conditions offers considerable difficulty and confusion although with more experience we shall be able to improve our diagnostic skill. There is one circumstance in which antihistaminic drugs may prove to be useful by using them as diagnostic agents in doubtful cases. If we find that treatment with a reliable antihistaminic drug produces a marked effect in controlling symptoms, we may presume that allergy is the cause of the trouble, whereas if such treatment produces no appreciable effects the opposite conclusion may be reached. Some veterinarians are already using this method of differentiation and regard pyribenzamine as quite helpful in this respect.

Treatment

As already stated, antihistaminic drugs are intended for the control of symptoms, not as curative agents. Treatment usually has to be continued as long as there are indications for its use. So far as pyribenzamine is concerned, this drug possesses a relatively wide margin of safety between the therapeutic and toxic dose. Experiments with dogs show that it can be administered in doses of 50mg over a long period of time without any apparent ill effects. The dosage for dogs runs fairly parallel with the human dose. For puppies of medium size, one-half tablet of pyribenzamine or 25mg, administered two or three times daily seems to be satisfactory, in the experience of small animal practitioners who have used the product. For adult dogs, one to two 50mg tablets, one to three times daily, is generally adequate. The size of the dose and the frequency of treatment depend on the judgment of the administrator and the severity of the symptoms. To dogs the drug is administered orally, although pyribenzamine is now supplied in ointment form, intended for topical application in cases of eczema, contact dermatitis, etc. For large animals, intravenous injections of a 2% sterile aqueous solution of pyribenzamine is recommended. The dose for large animals ranges from 100mg in the case of calves to 500 to 600mg for adult horses and cattle. The 2% solution acts as a powerful cerebral stimulant as well as an antiallergic agent. It should be injected slowly, preferably at body temperature and in comparatively small doses at first, in order to determine individual reaction to the drug. The stimulating effect of pyribenzamine on the central nervous system of horses and cattle is a side reaction which a number of veterinarians have used to advantage, particularly in treating comatose cases of hypocalcemia in cows. According to limited observations, one injection usually causes recumbent animals to regain consciousness quickly and to rise to their feet, after which calcium therapy or other indicated treatment can be administered.

In conclusion, antiallergic or antihistaminic treatment offers a new and promising addition to our armamentarium. Its usefulness will, no doubt, be greatly extended when we have had sufficient time and experience to determine its effect in a number of diseases which as yet are rather obscure and which may be due to allergy or to the liberation of histamine. For this reason, a great deal more work needs to be done by members of our profession to determine the effectiveness and practicability of new antiallergic compounds, not only in cases definitely known to be of an allergic nature, but also in a number of obscure conditions which may be due to the effects of histamine. It is possible that certain gastrointestinal disturbances may be due to the production or release of histamine by the bacterial decomposition of ingested food material.

In small animal practice, it is urged that the practitioner try antiallergic compounds in summer skin disorders in dogs, even if only to use them as an aid in diagnosing obscure or doubtful cases of allergy. If you have not already

done so, you may be able to get results unobtainable by the use of old-line remedies. However, as a word of caution, it is suggested that none should accept any new form of treatment or lose balance by overenthusiastic claims. We are all too familiar with the overemphasis placed on the discovery of new therapeutic agents, particularly by the lay press. Nevertheless, so far as antihistaminic drugs in general are concerned, abundant evidence has been presented to prove how helpful and comforting they are in cases of human allergy, particularly to those suffering from the effects of hay fever. The same, although to a more limited extent, may be said of the relief of allergy and anaphylaxis in domesticated animals although, as already mentioned, we do need to know more about their use under practical conditions as well as the extent of their limitations.

Tabulation of The Effects of Histamine in Laboratory Animals

1. Pounding heart.
2. Hypotension or fall in blood pressure.
3. Sweating, (in some animals).
4. Peripheral congestion, (skin wheals when injected intracutaneously).
5. Lacrimation.
6. Hyperglycemia.
7. Salivation, (particularly in cats).
8. Hyperperistalsis, (hence, diarrhea, colic, tenesmus, etc.).
9. Asthma.
10. Shock.
11. Contraction of bronchi, (particularly in guinea pigs).
12. Contraction of nictitating membrane.
13. Pupillary dilation.
14. Contraction of smooth muscles.
15. Increased sedimentation rate of blood.
16. Pain or sensitivity of cutaneous nerve endings.
17. Histamine content of lungs greatly increased in sensitized animals.

Beneficial Results Reported by Practicing Veterinarians Following the Use of Antiallergic Drugs in Diseases of Cattle.

Pulmonary edema.
White scours in calves (after acute stage).
Overloaded rumen.
Toxic indigestion.
Urticaria.
Fresh cow dysentery.
Laminitis.
Tympanitis.
Photosensitization.
Bovine stomatitis.
Anaphylaxis.
Hypocalcemia (milk fever); intended only for its stimulating effect on the central nervous system.

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Alopecia Due to Genital Anomalies

Obstinate skin diseases of the dog, in which alopecia is a predominating symptom, are frequently due to genital anomalies in both male and female dogs. Endocrine imbalance due to endometritis, pyometra, or other inflammatory or suppurative disorders in the female and orchitis in the male may be the cause of chronic skin disease. Hormone therapy properly chosen may give permanent relief of symptoms in some cases; others are benefited only temporarily. In the latter cases, or in those instances where infection can be demonstrated, surgery to remove the offending organ is followed by good results in selected cases.—Notes from address by Dr. C. P. Zepp, Pres., Amer. Vet. Med. Assn., New York State Veterinary Meeting, June 23-25, 1949.

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Tuberculosis Can Be Prevented—It Can Be Cured

In universities and laboratories throughout the country, America's scientists are conducting an unceasing war against tuberculosis. This year alone, more than 22 separate yet coordinated studies are being aided by the National Tuberculosis Association and its affiliates. Since 1904, the overall TB program has helped cut the death rate by 85%—yet TB still kills more people between 15 and 34 than any other disease.

All the work of the voluntary tuberculosis associations is supported by the annual sale of Christmas Seals. Of the money raised in the Christmas Seal sale, 95% is used for work within the state where it is contributed, and 5% supports the services of the National Tuberculosis Association.

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Foot-and-mouth disease vaccine for the protection of livestock can be prepared more easily and cheaply than heretofore by culturing the virus on the lining of the rumen of cattle. This new method of production has been developed by Drs. H. S. Frenkel and H. H. J. Frederiks at the National Veterinary Research Institute in Amsterdam.—*S.N.L.*

Clinical Encephalitis Occurring During an Outbreak of Vesicular Stomatitis in Horses

By R. D. Radeleff, D.V.M.*
Kerrville, Texas

LATE in April and early in May of 1949 the author was called into consultation by an owner of Thoroughbred horses in the vicinity of Kerrville, Texas, to aid in diagnosis of a "new" disease affecting one of his animals. The diagnosis rendered by a local practitioner was that the affected animal had contacted some plant capable of producing vesicular lesions of the oral mucosa.

The first case observed was an aged Thoroughbred mare which had been found on pasture in a state of general depression, with the tongue protruding and profuse salivation. Examination revealed coalescent denuded and necrotic areas on the free portion of the tongue, vesicles approximately one inch in diameter along the middle third of the dorsal surface, and additional coalescent denuded areas toward the pharynx. The tongue was considerably swollen. There was involvement of the skin of the lips in an area one to one and one-half inches wide, along all margins. These areas resembled the lesions seen in sheep infected with ovine echthyma, being for the most part dried scabs. The denuded areas of the tongue presented soft, slightly raised, creamy-yellow margins, the central areas being either slightly necrotic or bleeding from opened capillaries.

A diagnosis of vesicular stomatitis was rendered and the personnel instructed as to the cause, mode of action, transmission, treatment and sanitary precautions necessary to limit the outbreak. In spite of rapid action on the part of this owner, three additional cases appeared within 24 hours. At the end of 48 hours, 13 cases existed, all following the typical pattern described in the literature. Of the 13 cases, four were foals under six months of age. Two of these foals were nursing unaffected dams.

Ninety-six hours after the initial diagnosis, an urgent request was made for additional assistance, the owner stating that one of the mares was going crazy. On arrival, the author found the mare to be the dam of one of the previously affected foals. Observers present described the mare as having suffered about five violent convulsive attacks at intervals of approximately one-half hour.

When first examined the mare was sweating profusely, the sweat dripping from the ventral line. Although she attempted to graze, her efforts were consistently thwarted by spasmodic twitches of the general musculature. Her temperature was 103°F., respiration 30 per minute, pulse 100 per minute. The heart on auscultation revealed a cardiac insufficiency apparently located in the left auriculoventricular valve. A careful examination of the mouth failed to reveal any papules, vesicles or denuded areas. There was no salivation.

Fig. 1. Oral lesions of vesicular stomatitis shown by a Thoroughbred brood mare not complicated by encephalitis.

Attempts to lead the mare were futile although she would take one or two clumsy, incoördinated steps while left unattended. Insistence at the halter rope resulted in attempts to rear and strike, a vice never known before in this animal. During preceding attacks she had fallen and struggled violently, in the process

*United States Department of Agriculture, Agricultural Research Administration, Bureau of Animal Industry. In cooperation with the Bureau of Entomology and Plant Quarantine.

opening a wound about six inches in length along the left chest wall. A second wound was found vertically on the left carpus, opening into the carpal capsule.

A diagnosis of encephalitis was made, the suspected etiological agent being the virus of vesicular stomatitis. Hardly had this diagnosis been made when the mare seemed to jump forward, stopping just as abruptly in the "sawhorse" attitude of tetanus. This position was held momentarily; then the mare was seized with clonic spasms of all muscles, the net result being a most confused series of contortions —first falling, then convulsive paddling, followed by attempts to arise, resulting in the assumption of the position of a frog at rest, then violent lunging while in this position. The seizure passed after about ten minutes. The mare arose and became as we had found her.

More as a placebo for the owner but partly because of the seeming therapeutic value of sodium iodide in infectious equine encephalomyelitis, the mare was given 30gm of sodium iodide in 500cc of 25% dextrose solution. She made spasmodic mild lunges during the administration. No further attacks occurred and she appeared normal the following morning save for the effects of the exertions of the previous day.

At noon of the day that this mare recovered, a second became ill, under the same conditions but with more violence. The author did not see this case until late afternoon. The mare had suffered eight or ten attacks during the afternoon, according to the stablemen. She went into a seizure just after the arrival of the author. Unlike the first mare, this one had been placed in a 16-foot square box stall. She fell, then lunged into the wall from a squatting position, ripping loose the one-inch planking as though it were match wood. Kicking, crying, twisting of the neck over the back, nystagmus and incontinence of feces and urine followed. Profuse sweating began, the respirations rose to 45 per minute and the pulse alternately ranged from 120 to barely 20. After about ten minutes of this involvement the mare ceased struggling and lay quiet, resting. The temperature at this point was 104°F. She was soon able to rise and walk. She was given 30gm of sodium iodide in 500cc of 25% dextrose. One additional attack occurred an hour later, recovery thereafter being uneventful.

On the same ranch, one week after having shown vesicles, which healed rapidly, a quarter bred mare gave birth to an apparently normal foal. The hour of parturition was approximately 8:00 a.m. By 12:00 noon of the next day the colt had violent convulsions and psychic disturbances identical to those shown by the mares. This colt died at about 2:00 p.m. and was seen by the author at 5:00 p.m., at which time, aided by intense summer heat and a steel barn, decomposition was well advanced, precluding the advantage of thorough autopsy and collection of laboratory material. The colt did not, however, give evidence of vesicular involvement of the oral or buccal mucosa.

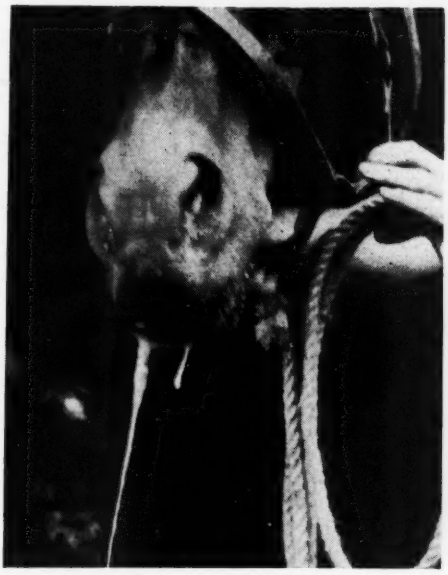

Fig. 2. Excessive salivation in uncomplicated vesicular stomatitis. As the disease progressed this salivation was noted to be extremely profuse and of a tenacious ropy consistency. Same mare as shown in Fig. 1.

The three instances of encephalitis given above are interesting, in that if they were indeed due to the virus of vesicular stomatitis, they are, perhaps, some of the few such instances of naturally occurring encephalitis without oral lesions.

Frank, Appleby and Seibold[1] state that no disturbances of the central nervous system have been observed following natural exposures. They demonstrated, however, very clearly in their work that the virus is capable of neurotropic activity in horses, cattle and sheep when intracerebrally injected. The symptoms displayed by their artificially inoculated animals are in general similar to those displayed in the cases described here: rise in temperature, psychic and motor disturbances. Paralysis did not

occur, possibly because the treatment interfered with the course of the disease.

It is unfortunate that material could not be obtained for careful laboratory study. It is difficult to explain the transmission pathways in these cases. In the discussion by Frank, *et al.*, of the works of others it is pointed out that Friedemann states that the brain capillaries are impermeable to passage of the virus while Sabin and Olitsky have shown that invasion of the brain and central nervous system is apparently exclusively through neuronal paths.

The vector, if such existed, most suspected in these cases would be the stable fly, *Stomoxys calcitrans,* since these flies were present in hordes in and about the stables in question.

Reference

1. Frank, A. H., Appleby, A., Seibold, H. R., Experimental Intracerebral Infection of Horses, Cattle, and Sheep with the Virus of Vesicular Stomatitis. *Amer. Jour. Vet. Res.*, 6:28-38 (Jan.), 1945.

Caricide* in the Treatment of Strongyloidiasis in the Dog

By Jules J. Werner, D.V.M.
Brooklyn, New York

MEMBERS of the genus Strongyloides occur in both animals and man. Reports of the occurrence of Strongyloides in dogs have been relatively few and there is a difference of opinion as to the classification of the parasite occurring in the dog. It is considered by some investigators[1] to be a separate species, *Strongyloides canis;* others believe it to be identical with *S. stercoralis,* the human form, because of difficulty of differentiation both morphologically and physiologically; and it has been suggested that it may be a strain of *S. stercoralis.* While some[2] maintain that *S. stercoralis* is the only form pathogenic for man, Faust and Kagy[3], using a strain from a primate host, infected one human volunteer and this infestation persisted for six months until it was terminated by treatment. It has been demonstrated,[4 5] that the dog can be infected readily with the human strain, even though man appears not to be susceptible to the strain naturally occurring in dogs. With all of these points in mind, the veterinarian should become familiar with the parasite because of the possible danger of transmission.

Lucker[1] stated that the occurrence of Strongyloides in the dog was first reported to the Zoological Division, Bureau of Animal Industry, in September, 1938. The author made the third such report in April, 1940. By March, 1942, there were seven such cases on record. However, there has been no study conducted to determine the incidence of infection.

Diagnosis

The usual habitat of the parasitic female in the host is the wall of the small intestine, where the eggs are deposited. They hatch in the intestinal mucosa and the rhabditiform larvae pass into the lumen of the intestine. These larvae are found in fresh feces of the host. Ova may

Plate 1—Strongyloides rhabditiform larva and *Ancylostoma caninum* ova, isolated from fresh feces of the dog treated. Low power.

*Reg. U. S. Pat. Off. Lederle Laboratories Division, American Cyanamid Co., New York, N. Y.

be found in feces only after purgation or in severe diarrhea. It is on the basis of this rapid development that the veterinarian can differentiate between Strongyloides infestation and *Ancylostoma caninum*, as embryonated ova and rhabditiform larvae of this latter species are rarely found in fresh feces. In the rhabditiform larvae of Strongyloides, the buccal cavity is shorter and the tail blunter than in the same form of the common hookworm.

Diagnostic procedures are described in some detail by Lucker[1].

Case Report

On June 17, 1949, a male, blond Cocker Spaniel, four months of age, was presented for treatment with a history of listlessness, debilitation, and emaciation. There was a profuse bloody diarrhea. Examination of a fresh fecal specimen revealed numerous Strongyloides larvae and some *Ancylostoma caninum* ova. Plates 1 and 2 show the forms isolated in this examination. On the following day, another specimen was obtained for examination at a diagnostic laboratory for confirmation of the diagnosis.

Even before the confirmation of the diagnosis was forthcoming, the owner was advised of the danger of transmissibility of this infestation to man, and euthanasia was recommended. The owner, however, requested that treatment be instituted. Therefore, on the following day, 400mg of caricide diethylcarbamazine was administered orally. As the dog weighed nine pounds, this was a dosage of approximately 45mg per pound of body weight. There were no signs of toxicity.

The animal was taken to Boston, Massachusetts, and it was suggested that he be examined at the Angell Memorial Animal Hospital. The report[6] on a fecal examination, made seven days following treatment, was negative for Strongyloides. The diarrhea was corrected.

One month later, on July 26th, the case was returned to the author for re-examination. The animal had gained weight and was again in good spirits. A concentration test, and smear and flotation tests revealed no Strongyloides infestation.

Discussion

Euthanasia was previously recommended in this case because of a recent authoritative report that there was no satisfactory treatment for the condition and that infested animals should be destroyed because of transmissibility to man, also because of previous personal experience. In April of 1940, the author had treated a five-month-old Cocker Spaniel. A course of gentian violet, per os and per rectum, was administered, as well as the recommended dosage of hexylresorcinol. This treatment was ineffective and euthanasia was performed as secondary infection had set in, presumably due to the lowered resistance of the animal.

While the successful treatment of one animal is entirely inconclusive, the writer would suggest treatment of Strongyloides infestation with Caricide, inasmuch as results heretofore considered impossible presumably were obtained.

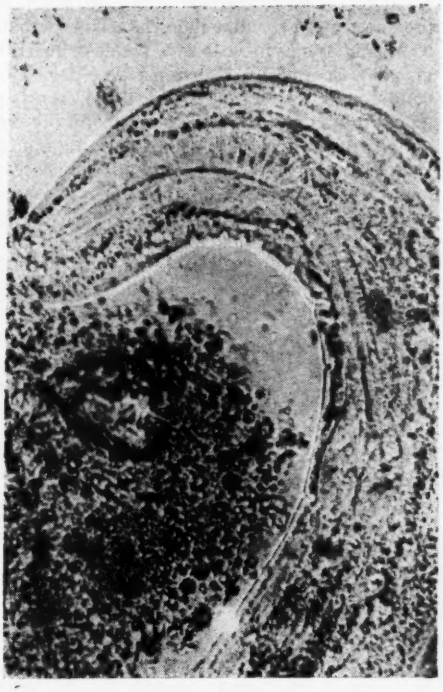

Plate 2—Anterior extremity of Strongyloides rhabditiform larva showing characteristic esophageal formation. Isolated from fresh feces of the dog treated. High power.

References

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Pasteurella Mastitis in Ewes*

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IN THE western range states of the United States it is recognized quite generally in the sheep industry that there is a considerable economic loss each year as a result of mastitis in ewes, commonly known as blue-bag. This condition is distinct from the usual forms of udder inflammations which occur during the lambing season, and it is difficult to understand why such a disease should appear in ewes on presumably clean range after the lambs are three or four months old. Investigation by the Montana Veterinary Research Laboratory showed that a very large percentage of the cases of this disease in Montana developed as the result of infection with a specific organism of the genus Pasteurella. These findings were reported by Marsh in 1932. Information obtained since that publication indicates that this specific mastitis occurs quite generally in the western states, having been identified in Texas, Wyoming, Utah, Montana, and Oklahoma. It is also evident from a study of the literature of other nations that the same specific mastitis occurs in France, Germany, England, Greece and Russia.

Review of Literature

In Europe, there is considerable literature on the subject of mastitis in sheep. According to Moussu, gangrenous mastitis was described by d'Arboval in France in 1823. In 1907, Dammaun and Freese described contagious mastitis of sheep, and a short gram-negative rod as the causative microörganisms. In 1915, Joest found *Bacillus pyogenes* in the milk of mastitis cases, and described the pathology of the disease. Stephan and Geiger, 1921, and Raebiger, 1925, distinguished between two types of sheep mastitis, one caused by cocci and the other by bacilli. Schmidt, 1923 and 1924, reported the use of autogenous bacterin as an immunizing agent. In 1929, Leyshon described mastitis in ewes as it occurs in England, with a bacteriological investigation of 38 cases. Various organisms were found, with Staphylococci predominating. In four cases on one farm, pure cultures of a small bipolar gram-negative bacillus were obtained. In 1930, Bederke described outbreaks of sheep mastitis in the North Caucasus district, with ten per cent morbidity and 50% mortality. Haupt, 1932, describes as the causal agents of two enzootic forms of sheep mastitis, *Micrococcus ovis* Migula, and *Bacterium ovinum* n. sp., which corresponds closely to the organisms described by Damman and Freese. In 1932, Marsh described a specific mastitis in range sheep in western United States caused by infection with a Pasteurella, which probably was the same organism described by Damman and Freese. In the same year, Miessner and Schoop reported a detailed investigation of 27 cases of mastitis on eight farms, in which they found the Damman and Freese organism 23 times. They proposed the name *Bacterium mastitidis.* In Russia, in 1933, Milovzorov and Tchasovnikov reported effective immunization with a formalin-killed bacterin. In 1935, Lesbouyries, Berthelon and Macrides described mastitis caused by *Bacterium mastitidis,* and discussed the close resemblance of this organism to Pasteurella. In 1936, Macrides described two types of enzootic mastitis of sheep in Greece—gangrenous mastitis, caused by the micrococcus of Nocard, and contagious mastitis caused by *B. mastitidis* of Damman and Freese. In 1937, Weinberg, Forgeot and Moureu reported an outbreak of 18 cases of gangrenous mastitis in a flock of 150 ewes, with 12 deaths, with a diagnosis of *Clostridium perfringens* infection. In 1938, Rosati and Bertolino reported on mastitis in sheep and goats in France, Italy, and Tunis, and incriminated *Corynebacterium ovis* as the causative microörganism. In 1941, Carpano reported on gangrenous mastitis in Albania, and Koens reported a highly fatal gangrenous mastitis in Holland. In 1943, Smith and Harnden reported Pasteurella mastitis from Oklahoma.

Etiology

The etiological agent is *Pasteurella mastitidis.* It corresponds in its cultural reactions to Jones' type 3, *P. boviseptica,* except that it ferments raffinose. In the early stage of the udder inflammation, pure cultures may be isolated from the milk secretion. Later, other bacteria, such as *Corynebacterium pyogenes* or Staphylococci, often invade the diseased tissue.

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Between August, 1931, and April, 1945, 118 mastitic udders were cultured in the early stage of the disease. Three of the cultures developed Staphylococci, one *C. pyogenes*, one *Escherichia* and 113 were *P. mastitidis* in pure culture.

Occurrence

The disease is sporadic not enzootic in nature, occurring between lambing time and September 1. There may be fewer cases in the prairie sheep of eastern Montana than in the mountainous areas where much of the lambing is done in sheds. One of the predisposing factors seems to be related to the size of the lambs. The heavy lambs are rather rough with the ewe when nursing. A large lamb will raise the ewe off the ground in its enthusiasm. Bruising of the gland might easily take place, to be followed by invasion of the Pasteurella organism. We have evidence to show that the organism is often present in the body tissues, particularly the lungs. Transmission of the infection would seem to take place on the bedgrounds, when the sheep are camped repeatedly in the same place. However, this point could not be proven experimentally.

The disease seems to occur in the absence of any particular filth conditions of the bedgrounds. A national forest grazing permit restricts the camping to one night stands. Since the sheep go into the forest along about July 1, the bulk of the cases appear when the sheep are on dry, hard, mountain range.

The first outbreak which we investigated in 1932 occurred in a band of 1200 ewes which were being summered on a dry range consisting partly of grass and partly of old wheat land on which there was a growth of Russian thistle.

A band of 1900 ewes observed in 1948 will serve as an illustration of the occurrence of mastitis. This particular band was shed-lambed in April. Four cases occurred by June 1, at which time they were moved to hard, dry, clean range, where they remained until fall. The sanitary conditions were excellent during the three summer months. Twenty-three cases were detected in the first 45 days of this period and 27 cases in the latter half of the period. This illustrates the continuous occurrence of the disease.

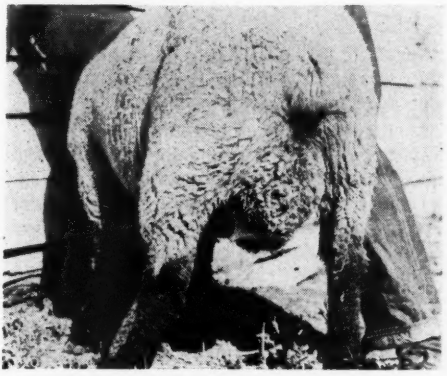
Pathogenicity

Practically all the Pasteurella cultures are pathogenic for the normal lactating udder when first isolated. By intraperitoneal route of inoculation the organism is pathogenic for guinea pigs and rabbits, but variable for mice.

There is more variation in pathogenicity of the variant strains than in their antigenic action. Some of the variants are much more pathogenic than others.

Symptoms

The disease develops very rapidly, producing an acute systemic disturbance with high fever (105°-107° F.), loss of appetite, accelerated respiration, and acute mastitis. After the first two to four days the fever subsides, but the local process in the udder continues to develop. The ewe may die within three to seven days, probably from a toxemia. Otherwise, the udder breaks down, forming a chronic abscess, and the ewe returns to her normal condition except for the local lesion which, if it ruptures, may continue to discharge for several months. Mastitic udders almost never regain their functions.



Mastitis of left udder. This ewe walks with a limp. Note the position of the left leg when standing. In walking the leg is carried outward with a swinging, wooden-legged motion to avoid contact with the tender udder.

The first noticeable symptoms are those of inappetence and dejection, the ewe standing off by herself, not allowing her lamb to nurse. When forced to move she will show lameness in one hind leg due to the painful udder. This is *the* important early symptom. She swings the hind leg of the affected side outward thus avoiding contact with the painful side of the udder. During the first day, the udder is painful and hot without too much enlargement, no discoloration, and the milk is normal. After the first day the gland enlarges, begins to indurate and the secretion changes (acid pH 7.3-7.6) through the successive stages of whey separation, casein coagulation and finally a caking of the udder in which there is no secretion. This process usually takes place in four to six days. The udder may or may not become discolored. The bluish discoloration is responsible for the term "blue-bag". This is misleading for it occurs in a small minority of cases. The infection is practically always unilateral. The unaffected side and milk are nor-

mal unless the animal remains extremely ill for some time, then milk secretion ceases.

It is well to mention here the fact that normal ewe's milk is bacteriologically sterile. The average reaction of 158 milk samples of actively lactating ewes was pH 6.3. After weaning, in the fall, when the udders were beginning to become inactive, 54 samples averaged pH 7.25. Active clinical mastitic milk, after the first day of the infection was pH 7.3-7.6.

The course of the disease in an experimentally inoculated ewe is typical of the natural infection.

August 12. 5:00 p.m.—A culture of *P. mastitidis* was inoculated into the teat canal of the right udder of a healthy lactating ewe.

August 13. 8:00 a.m.—Temperature 106.7°. Respiration 64. Right mammary gland full and hot. Milk apparently normal. 11:15 a.m. —Temperature 106.3°. Right side of udder enlarged and becoming hard. Milk appeared normal, but secretion drying up. 5:00 p.m.— Temperature 106.5°.

August 14. 8:00 a.m.—Temperature 104.3°. Respiration 26. Ewe depressed. Some flakes in milk. 5:30 p.m.—Temperature 103.8°. Milk thinner and the whey and curd separating.

August 15. 8:00 a.m.—Temperature 103.2°. Secretion from udder thin and colorless. Physical condition of udder unchanged.

August 17. The ewe died.

Pathology

The course is either acute or subacute, terminating in chronic mastitis if the ewe lives. The inflammation of the udder begins as an exudative process of the alveoli and as the disease progresses it becomes either suppurative or gangrenous. Suppuration, followed by abscess formation involving the entire gland on the affected side, is the most common termination.

Histological sections show marked hyperemia of the capillaries. This intense vascular engorgement, followed by dilation, is probably responsible for the swelling of the udder. The cells lining the alveoli begin to show cytoplasmic degeneration, then pyknosis, karyorrhexis or karyolysis. The cells of the alveoli are desquamated in part or completely. Great numbers of very small coccobacilli are present in many areas.

Subcutaneous Udder Nodules

One phase of the mastitis problem that was not recognized by us until 1941, is an udder abnormality produced by the presence of nodules, or perhaps they should be classed as cysts, which may be soft, semi-solid, or hard, varying in size from one-half inch to three inches in diameter. They are usually located along the medial line of the udder, just beneath the skin, yet attached loosely to the glandular tissue.

They may or may not develop into clinical mastitis. This point has not been proven as yet. However, we do have some evidence that connects the two. Sections through the subcutaneous cysts showed that they apparently developed as the result of necrosis of all the alveoli in a lobule. The cysts contained scattered masses of cells having degenerated nuclei with masses of small coccobacilli among the nuclear debris.

Some additional information is gained by a study of the case histories from several of these so-called nodular ewes originating from our station bands.

Ewe 793 was culled from the station band in 1945 because of udder nodules. Other than for the anteromedial nodules that did not change throughout the 1946 and 1947 lactation seasons, the udder remained normal. Four months after lambing in 1948, her right udder was dry, yet apparently normal. Mastitis was present in the left side from which *P. mastitidis* was isolated. Hard nodules were still present to the left of the anteromedial line.

Ewe 661 was culled in September, 1946, at which time there was a semisolid one and one-half inch nodule located anteromedially on the udder and the milk was sterile. The ewe lambed normally May 3, 1947. May 9, a slight enlargement to the right of the anteromedial line was noted. However, at the time it was not determined that this was pathological. Milk samples were sterile. A well developed case of mastitis with a pure culture of *P. mastitidis* in the milk was observed May 28.

Ewe LS-704 was culled from the station band in 1944, due to the presence of subcutaneous udder nodules. She lambed normally in 1945. May 11 and September 21, 1945, the milk was sterile and the udder normal other than for the anteromedial nodules. No other observations were made until the ewe lambed April 19, 1946, at which time the milk was sterile and the udder appeared quite normal except for the same nodular mass located anteromedially. April 24 and June 19 there was no change in the nodular mass and the milk was sterile. The ewe was not observed again until July 6, at which time she was sick with a temperature of 106.5°. The right udder was enlarged, hot, and beginning to get hard, with the milk separating—a typical case of mastitis. A pure culture of Pasteurella was recovered from the milk of the right udder,

which continued to develop into a typical gangrenous fulminating type of mastitis.

Ewe LS-711 was culled in 1944 because of subcutaneous udder nodules. This ewe lambed normally in 1945, the udder and milk were normal other than for the nodules, yet the milk from the left udder contained *P. mastitidis*. On May 15 and May 23, cultures were negative. The ewe was sick May 27, and May 29 the left side was definitely mastitic. The ewe was dead May 31, and *P. mastitidis* was recovered from the secretion of the left side.

Ewe LS-718 was culled because of multiple anteromedial udder nodules in 1947, although the udder and lactation were otherwise normal and cultures were sterile. She lambed normally in 1948 and no change occurred in the udder. She lambed May 2, 1949, the udder and milk being normal and sterile. However, on May 11 and again on May 14 and May 24, the right udder milk yielded pure *P. mastitidis*. The milk and udder were normal other than for the chain of hard median line nodules.

Incidence of Infection in Station Band

Between the years 1931-1948, inclusive, we have records of 19,550 ewes lambing, of which 452 (2.3%) developed mastitis. One hundred twenty of these udders were cultured and *P. mastitidis* recovered in 102 instances. The mortality averaged 21%, which does not take into account the lamb loss from these ewes nor the strays accountable to the mastitic ewe which drops behind and is lost in the timber and eventually killed by predators.

Beginning in 1939, we established a policy of very carefully examining all station ewes. All mastitic udders were eliminated from the breeding band. Through the years 1939-1942 the incidence of mastitic udders fluctuated between 2.5% and 3%. We were getting nowhere with our clean-up program.

In 1941, the nodular type of udder abnormality was recognized as a possible source of the continued carry-over of mastitic infection in our station bands. Accordingly, we began culling that type of udder in addition to the definite mastitic cases. We culled 3% of the ewes in 1941 and 2.5% in 1942. In 1943 and 1944 the incidence dropped to 1.8%, in 1945 to 1.9%, and 1946 to 2.0%. The culling operations were very carefully carried out in 1946 in an effort to eliminate all infection from the bands. It was felt at that time, that if this effort did not produce results, then the method would be worthless to the average sheep man, for we really took time and care in doing the job. The 1947 results showed a reduction to 1.5%. However, following the same careful procedure in 1947 the incidence in 1948 was 1.8%. So, in reality, we feel that the culling of nodular udders probably contributed a scant

Mastitis of right udder. The udder was indurated, enlarged, somewhat discolored and painful. Pure culture of *P. Mastitidis* was recovered from the milk secretion. Left side and milk normal other than for decreased secretion.

½ to 1% reduction in mastitic udders. Certainly, culling cannot be recommended with a view to eliminating mastitis. However, we do not believe it should be ignored and we intend to continue to recommend it.

Carriers of *P. Mastitidis*

Ewe J-63 was born in 1938, lambed in 1940, and again April 14, 1941. On April 29, 1941, the udder and milk were normal with a pH of 6.7. However, the left side yielded a pure culture of *P. mastitidis*. The udder was normal and the milk of the right side sterile and the left side yielded pure cultures of Pasteurella 17 times between April 29 and October 3. Incidentally, one of these cultures was nonpathogenic for a normal lactating udder. This ewe lambed in 1942 and the udder was normal and the milk sterile.

It is well to remind you that ewe's milk is a sterile product, so the presence of any microörganism is of significance.

Ewe F-87 was on a vaccination test and later exposed August 15, 1939, to infection by arti-

ficial inoculation via the teat canal. The udder functioned normally and she remained healthy until the following year. She lambed in April, 1940. October 3, 1940, the udder developed mastitis and a pure culture of *P. mastitidis* was isolated. At that time of the year her udder was drying up so that it was not entirely spoiled. She lambed again April 3, 1941, and both sides of the udder functioned although the right side again yielded pure *P. mastitidis*. After three days she became acutely ill with severe mastitis in that side. This was a definite case of the organism lying dormant in the nonfunctioning udder over the winter to flare up after the tissue was placed under the strain of heavy lactation.

An interesting culture was recovered from the udder of ewe E-39. In 1938 this ewe was used on an immunization experiment. On August 17, 1938, a test inoculation was made into the right teat with a culture of *P. mastitidis*. No evidence of mastitis appeared, and on August 22 a second inoculation was made into the left teat. Again there was no immediate evidence of the development of mastitis, except a slight temporary thickening of the milk, but on October 27 the left side of the udder showed a slender indurated cord at the base of the teat. The ewe was left in the breeding band, and on June 13, 1939, she lambed. No milk could be obtained from the left teat, and on June 14 a few drops of greenish liquid were squeezed from the teat. This material was cultured and developed pure *P. mastitidis*. This was interpreted as evidence that the culture inoculated into the teat ten months before had maintained itself in the udder without producing acute mastitis. This finding indicated a method by which the infection could easily be carried over in a band of ewes. An attempt was made to remove the mechanical obstruction to the flow of milk, by introducing a sterile teat instrument. As a result of this manipulation, an acute case of mastitis developed.

Immunity

An effective immunization product would be very valuable in controlling this disease. However, our work, beginning in 1932 with the study of formalized bacterins, has yielded nothing that is of practical importance. During the past few years this study has been concerned with the variant strains of *P. mastitidis* in the hope of striking upon one of high antigenic value. Some of the variants are less pathogenic than others. For example, the white and opaque colonies are most pathogenic. The blue, blue-grey, and grey colored colonies are almost nonpathogenic.

This type of avirulent organism will produce approximately 50% immunity against severe artificial infection. We could and did intend to use this living avirulent bacterial suspension as a vaccine until we found that the organisms did not remain viable long enough for us to get the vaccine from the laboratory to the field. Until such a time as someone devises a vehicle that will accomplish this end, the vaccine must remain in the laboratory. At the present time there is no effective immunizing agent against *P. mastitidis*.

Treatment with Sulfamethazine

In the past, our attempts to treat mastitis in ewes have been unsuccessful, because of the rapidity with which the disease develops, and the difficulty of getting early action with treatment under range conditions.

In 1946, Dr. Charles Schroeder, of the Lederle Laboratories, suggested that we try sulfamethazine, because there was some evidence that this drug had a bactericidal or bacteriostatic effect on some Pasteurellas. Therefore, treatment with sulfamethazine was tried in 1947 and 1948 on 14 cases of mastitis which became available at the laboratory. Three of these cases were not the usual Pasteurella infections. Two were Staphylococcus infections, and the sulfamethazine failed to cure them. One was an *E. coli* mastitis, and in this case treatment with sulfamethazine resulted in the udder returning to apparently normal lactation.

Of the 16 ewes suffering from Pasteurella caused mastitis experimentally treated with sulfamethazine, seven were considered cured. The affected side returned to normal lactation, cultures from the milk were free of the organism and the ewes raised their lambs. In the eight remaining cases, the udder failed to return to normal. There was one fatal case, in which the ewe died within less than 24 hours after she was brought to the laboratory for treatment. In five cases, the mastitis had existed for at least two days when treatment was started. These results at first glance appear to indicate a very small percentage of success. However, when considered in the light of experience with several hundred cases of Pasteurella mastitis among which not more than three very mild attacks resulted in a return to normal function, this proportion of 27% returning to lactation is significant.

If one considers only the cases in which treatment was started within the first 24 hours of the clinical attack, the proportion of recov-

(*Continued on Page* 506)

Review Your Tax-Saving Opportunities Before Year-End

By Harold J. Ashe
Tax Counselor

WHILE veterinarians, generally, continue to lament the burdensome size of their individual income tax bills, all too few of them consider the income tax as a year around problem. Except as a topic of doleful conversation, they are likely to push aside all tax considerations until annual tax filing time each year.

Their attitude seems to be that there is "nothing we can do to reduce the tax as computed on our income, so why worry about it until we make out our income tax return."

This may be an expensive philosophy, and calls for clarification. Usually, there is something taxpayers can do about income tax assessments, provided they keep income taxation well in mind throughout the year, particularly if they review all pertinent facts prior to year-end.

However, it cannot be too strongly stressed that after the year's business is concluded on December 31, the die is cast. From then on, the taxpayer reports the facts in his income tax return and pays the tax calculated from those facts. It is too late to control, even in small degree, the facts on which the return must be made.

While veterinarians may operate as copartnerships, this should not be permitted to confuse the points here analyzed. The individual veterinarian, as a taxpayer, must finally report his own income as an individual, whether his income is derived from a partnership or sole proprietorship of a practice. For purposes of simplification and illustration, it will be assumed that the reader is a sole owner.

Prior to December 31, the taxpayer may be presented with many alternatives which possess tax-saving possibilities. These alternatives and choices are well known to large corporations and taxpayers because they represent legitimate means by which taxes may be substantially reduced. They should be better understood by the veterinarian. Until these tax-saving devices are fully grasped by all, some taxpayers will continue to be at a distinct tax disadvantage.

With individual income taxes now taking more than $16 of every $100 of taxable income, even in the lowest tax bracket—and after some of this income may have been taxed as corporation income before distribution—the income tax is something more than an accounting nuisance to be considered only around the annual tax filing period.

Consider first the situation of a veterinarian who has worn-out machinery or equipment used in his practice which has not been fully depreciated. If this equipment is sold before year-end for its salvage or scrap value, the loss may be written off and, thus reduce the income tax. The loss will be the difference between the value yet to be recovered through depreciation and the scrap value received.

This course of action is particularly sound where it is expected current income will be higher than in a subsequent year in which, otherwise, the sale might be made. The reason is: the higher the tax bracket, the greater the tax saving.

Few individual taxpayers can predict with any degree of exactness what their adjusted gross income will be in future years, but to the extent they can approximate future taxable income, to that extent can they determine to take or pass certain tax-saving opportunities presented to them.

Even where taxable income is likely to be substantially the same in both the current and ensuing year, it may be wise to take tax advantages in the current year. First, it means the taxpayer makes an immediate tax saving in cash, instead of a year later. Second, if there is no likelihood of being in a higher tax bracket the following year in the normal course of events, there is always the possibility of being in a lower tax bracket, due to unforeseen circumstances, such as casualty losses from fire or other causes.

Rebuild Value of Depreciated Assets

In addition, the veterinarian should give serious consideration to rebuilding the value of his depreciable assets for purposes of depreciation write-offs, as well as to keep his practice abreast of the times, if not ahead of competition. Many veterinarians show highly inflated earnings because, temporarily at least, they struggle along with worn-out equipment, cars and other assets which no longer have any

yearly depreciation left as a charge against the practice.

This may appear to be a highly favorable position for the veterinarian to be in because, even though it does increase his tax, a considerable added profit remains. This, however, is a snare and delusion in most cases. If, in fact, assets are so old that they have been fully depreciated over their useful life it generally means that such assets are obsolete. Such a condition cannot exist indefinitely because, eventually, worn-out equipment becomes more and more expensive to use. Finally, even where profits are concerned, this situation will express itself in sharply decreased profits.

If allowed to run its course, such a management policy must result in the veterinarian's having a job-lot of broken down and completely worthless equipment, an antiquated office, and antique car. About this time, if depreciation reserves have not previously been set aside, he may also wake with a shock to the realization that he has no funds with which to replace these assets of his practice.

If the veterinarian does have reserves—and a surprisiingly large number do not—he should at some point elect to re-invest these funds in new equipment, office fixtures and, for business use, a car, both from the standpoint of sound management and because of the tax-saving implications of such action.

In replacing fully depreciated business assets, the veterinarian, in a left-handed manner, gains a tax credit which, in effect, makes it possible to acquire new assets at considerably less than the purchase price. Thus, a new business car costing $2000 with a five-year useful life can be written off at the rate of $320 a year ($2000 less, say, $400 scrap value at the end of useful life). This new write-off in the depreciation schedule reduces the net profit by exactly this amount and is reflected in the highest bracket in which the taxable income may fall. If the veterinarian is in the 34% (less 1948 reduction) bracket, his individual income tax will be reduced by $94.75.

While such newly acquired depreciable assets serve the laudable purpose of reducing the artificially high net income and the income tax, they, at the same time, rebuild the veterinarian's physical assets which may have been slipping sharply downhill.

For example, the veterinarian may have certain depreciating assets worth, let us say, only $5000, and with some of these assets completely depreciated. This compares with valuation at time of acquisition seven years ago of $15,000. In such a case the taxpayer may well consider whether new equipment, tax-wise, may be in order, provided new assets can be used with profit to the practice.

While acquisition of new assets, if acquired late in the year, will not permit sizeable write-offs in the balance of 1949, it will ensure full year write-offs each year starting with 1950, about the time other assets may disappear from the depreciation schedule.

Special outlays may serve the same purpose. If the veterinarian owns his own office building or animal hospital this may be in need of repairs already postponed too long. If repairs are made by December 31, 1949, they are deductible in the 1949 tax return. Repairs, however, should not be confused with alterations or additions which must be depreciated over useful life or, if the building is leased, over the period the lease has to run, or the shorter of the two periods.

Maintenance and Repair Costs

If the veterinarian has as little as $500 of taxable income in the 30% (less 1948 reduction) tax bracket, a $500 repair job in 1949 will reduce his 1949 income tax by $132. In effect, the taxpayer pays $368 for repairs and, indirectly, the government pays $132, the amount of the tax saving.

The above will indicate a few of the possibilities afforded veterinarians alert to income tax implications of their business, and who analyze their position before year-end.

If the veterinarian has sources of income other than his practice, he should carefully scrutinize expenses incident to such income.

Take a veterinarian who owns rental property. This is a residence subject to rent control. After paying taxes, taking depreciation and spending a bare minimum on repairs, this property shows only $100 net on a $6000 investment. Until rent controls are lifted, the taxpayer is determined not to spend a dime more than necessary to maintain the property. Ordinarily it is sound doctrine to make each income source stand by itself, not rob one source to support another. Thanks to rent control and income taxation, a new factor is involved.

This property badly needs outside painting to protect it against accelerated depreciation by the elements. The job will cost $250.

Wisdom should dictate painting, even though a loss is sustained. The loss can be subtracted from other income, reduce the taxable income by that amount.

The thing to remember is that while the taxpayer may think in terms of income from each

source separately, and generally this is a sound view, the government, for tax purposes, calculates income tax on income from all sources combined.

In the case just cited, the paint job will reduce taxable income by the amount of the painting bill. If the taxpayer is in the 30% tax bracket, the tax saving will be $66.

Even larger tax savings can sometimes be made by taxpayers in personal deductions and exemptions. It should be kept in mind that these personal deductions and exemptions have as important a bearing on the taxpayer's take-home earnings, after income tax, as do business deductions, and they should have equally careful consideration.

Personal Exemptions

In the matter of exemptions, a taxpayer may often lose out because the amount of support given a dependent does not qualify under the law. A case in point: two sons share equally in supporting an aged father, entirely dependent on them. Each son gives his father exactly 50% of the support. Neither can claim the father as a dependent. To qualify as a dependent, the father must receive more than half of his support from the taxpayer counting him as a dependent. Solution: one year one son contributes more than half of the support and takes the exemption. The following year the other son contributes more than half and, in turn, claims the exemption. This is strictly a question of fact. Where each son has been giving exactly one-half, it is possible to correct this mistake before the year end. Such an exemption is worth about $100 tax savings in the lowest tax bracket. By alternating, each son will get $100 or more tax benefit each two years.

Personal deductions should come in for more careful study by the taxpayer before year-end. An increasing number of taxpayers are finding it profitable, tax-wise, to alternate between using the short form or standard deduction one year for their deductions and, the next year, itemizing the actual deductions on the long form.

As the reader is aware, when he does not elect to itemize his personal deductions he, nevertheless, is allowed approximately 10% for such deductions on the short form and on the long form is allowed a like amount up to $1000 maximum on his adjusted gross income. Given these alternatives, many taxpayers are allowed an amount for personal deductions far in excess of what they actually could itemize. This opens up possibilities for considerable tax savings in two consecutive years.

The taxpayer, of course, should itemize his personal deductions when they exceed the 10% allowed in the short form or standard deduction in the long form. He should use the short form or take the standard deduction when personal deductions will not aggregate the allowance. Before electing what he should do, and before year-end, he should weigh the possibilities for tax savings in alternately itemizing his deductions one year, and taking the standard deduction in the following year, or vice versa.

Personal deductions can be itemized in the long form only if actually incurred and paid. It is this fact that makes it possible sometimes for the taxpayer to deliberately elect before year-end which form will be most advantageous to him for the year drawing to a close, and make it even more advantageous by certain before year-end acts of his.

Thus, before year-end, he may crowd a maximum amount of personal deductions into the year, so that considerable tax savings will be made in that year by itemizing personal deductions instead of taking the standard deduction. This may reduce to a minimum the amount of personal deductions to itemize the following year. In the following year with, perhaps, only 5% in itemized personal deductions, use of the short form or standard deduction will effect a saving. As the taxpayer has exceeded the 10% in one year, without losing the 10% in the following year, the combined savings for the two years by alternating represent a clear tax advantage he otherwise would not have had.

Take a typical case. The taxpayer calculates before year-end that his personal deductions (contributions, interest, taxes, losses from casualties or theft, medical and dental expenses, non-business bad debts, etc.) will aggregate about 10% of his adjusted gross income. It appears it will be immaterial whether he takes the standard deduction or whether he itemizes his deductions. In either case the tax will be about the same. This is the way matters stand on December 15 of the tax year coming to an end.

However, this taxpayer is alert to the tax savings inherent in alternating between itemizing one year, taking the standard deduction the next year. So, because he is already at the break-even point, he realizes it may be possible to exceed the standard deduction by accumulating additional deductions which, normally, might ride until the next year.

First, he finds he has pledged $50 to a certain charity which he had intended paying

in 1950. He pays it before year-end 1949. Now the sum total of personal deductions stand at $50 above the 10% break-even point. He is committed to using the long form and itemizing deductions.

Next he finds there are some non-business taxes, in the amount of $150 which, ordinarily, he defers paying until January. These, too, are paid in December.

He has already paid medical, dental and hospital bills to the amount of 5% of his adjusted gross income. (This 5% is not deductible and should not erroneously be calculated in determining whether all deductions exceed 10% of adjusted gross income.) However, additional medical bills above this 5% are fully deductible. So he immediately pays a $200 doctor bill, and wipes out a $50 bill for drugs, prescriptions and vitamins, and also pays a $20 bill for ambulance services he has neglected honoring.

He remembers that a dependent daughter has been postponing needed dental work which certainly would be done in 1950 at the latest. This is completed and paid for before year-end 1949. All in all, he picks up another $300 in medical and dental deductions which, otherwise, would have gone onto the new year. In that event they probably would have been of no value as a deduction because of the 5% exclusion clause where medical-dental deductions are concerned.

Now if this taxpayer had let matters run their course, he probably would have wound up by taking the 10% standard deduction in both 1949 and 1950 returns because his personal deductions, if not reviewed before year-end 1949 would have been rather evenly spread over two successive years. In neither of these years would such personal deductions exceed the 10% standard deduction. By crowding a maximum amount of his personal deductions into 1949 he has almost 20% in itemized deductions for 1949. Regardless of what his 1950 itemized deductions may total, he will be entitled to the standard deduction at the very least in 1950. If, before year-end 1949, he had not been alert to these tax-savers he would have had only 10% allowance for deductions in both years.

Conversely, on analysis, the taxpayer may decide he does not have enough personal deductions and cannot accumulate enough by year-end 1949. In that event, he may deliberately postpone paying as many of these deductions as he can until 1950, thus crowding part of 1949 as well as all of 1950 deductions into 1950.

A word of caution. Exclusion of deductions to a later year must be a matter of fact. For example, if a contribution has been made in 1949, this is a fact. It cannot be entered in the 1950 return simply because it will save taxes in that year. Facts cannot be altered. It is when and how the facts are made that effects the legitimate tax saving.

Some shrewd taxpayers make what might be called "dry-run" individual income tax returns one or two weeks before year-end. That is, they actually make out a tentative income tax return showing anticipated adjusted gross income as well as exemptions and total itemized deductions to date. Thus, before year-end they have knowledge of what tax bracket any of their taxable income will be in. They know what tax-saving inducements they have. They know which steps here enumerated they should take or, possibly, postpone until the next year.

While it is realized that these tax-saving opportunities involve extra work before year-end and include rather close estimating of what the year's adjusted gross income will be before the year is ended, it may be a profitable employment of the taxpayer's time. It may be far more remunerative than any other business activity during the entire year, time considered against the savings made.

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Pasteurella Mastitis in Ewes

(*Continued from Page* 502)

eries is increased to 50%. It is evident that the treatment is not effective unless started within the first 24 hours.

In seven of the 16 treated cases, intravenous injection of sodium sulfamethazine was combined with oral administration of sulfamethazine at the initial treatment. In the remaining nine cases, in one of which the udder returned to normal function, the administration was oral. The initial dose by the mouth was 15 to 18gm, followed at 24-hour intervals by two 6gm doses or another 15gm dose.

Determination of the sulfamethazine levels in the milk of two treated ewes showed that about five hours after administration of 18gm by the mouth, the milk level varied from 5.4 to 6.8 mgm/100 ml, and at 20 to 24 hours it ranged from 9-14.3 mgm/100 ml. In both cases, during the three days of treatment the sulfamethazine milk level did not drop below 6.8 mgm/100 ml, which is considered to be within the therapeutic range.

While the data on treatment of Pasteurella mastitis are very limited, the results indicate that treatment with sulfamethazine pays, when administered in the early stages of an attack.

Notes on Veterinary Parasitology

By A. O. FOSTER, B.A., M.A., Sc.D., Beltsville, Maryland

Dipping Lameness in Sheep

During the past three years, several outbreaks of lameness in sheep have followed the use of dips containing benzene hexachloride and rotenone. So far, most, if not all, of the cases have been reported from New Zealand but there is every reason to anticipate the occurrence of the disease in other sheep-raising regions and to be forearmed with preventive measures.

In most epizootics, from five to 20% of the dipped sheep are affected, most of them lambs and yearlings. The disease appears from two to four days after animals are dipped in a bath that has stood for a few days after initial use or preparation. Lameness increases in severity for a few days, then abates slowly. Affected sheep lose condition rapidly, which causes alarm in spite of eventual recovery.

Although circumstances were such as to cast suspicion upon the newer dips, especially since the disease did not occur when the older arsenical and phenolic dips were used, studies by Dr. L. K. Whitten of New Zealand** have shown that bacterial infection is the cause of the lameness. The organism chiefly responsible is *Erysipelothrix rhusiopathiae*. As a preventive measure, Doctor Whitten suggests that an antiseptic or sterilizing substance be incorporated into the dip-concentrates by the manufacturers.

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Unusual Intoxication from Antiparasitic Medication

An officer of the Sudan Medical Service has described† an alarming condition of specific, delayed, unsuspected intoxication following the use of a comparatively new, effective drug for the treatment of human parasitic disease. The drug (stilbamidine) and the disease (kala azar, and a few related protozoan infections) are of little concern to veterinarians, but the lessons that may be learned from the report are of permanent importance to veterinarians and to all who are engaged in the investigation of chemotherapeutic agents. Indeed, to investigators in the field of parasitic diseases, the development of the diamidines (of which, stilbamidine was the first), principally by British workers, is an interesting and remarkable chapter.

Revelations of more particular interest to veterinary science are the selective toxic action of the drug on the trigeminal nucleus and fifth cranial nerve, the presence of the drug in the urine several years after the end of treatment, the initial appearance of neuropathy many months or years after the end of treatment, the high incidence of the central nervous symptoms, and the severity of the chemical intoxication. These findings, which are indisputable, emphasize the exceptional importance of being alert for late, and possibly severe, manifestations of drug action.

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Ever since the eradication of piroplasmosis, anaplasmosis has loomed as a serious and somewhat similar cattle disease. Taking advantage of the cross immunity demonstrated by Theiler between the injurious and benign species. *Anaplasma marginale* and *A. centrale*, some livestock sanitarians believe that the disease could be controlled by introducing the comparatively harmless *A. centrale* into native livestock.

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Blood parasites are thought to be electrically charged bodies, and presumably obey the laws that govern such bodies. The electric charge conceivably has an important bearing on antibody formation, serum reaction, agglutination of red cells, virulence, host-parasite adjustment, and response to chemotherapeutic agents. Researchers in trypanosomiasis, moreover, are beginning to suspect† that the electric charge may be altered by syringe-passage of the organisms and, perhaps, by serial passage through unnatural hosts. Since much of our knowledge of trypanosomiasis has come from studies of the infections in laboratory animals, principally mice, as well as from these and other studies involving the routine use of syringes, it now seems possible that the findings may not wholly apply to naturally occurring infections. In a broader sense, this situation suggests but another item which indicates the value of caution in reaching generalizations from laboratory studies on small animals.

**Cause of Dipping Lameness in Sheep. *New Zealand Jour. Agri.*, 76(5):420, May 15, 1948.

†Sati, Mohammed Hamad. Post-Stilbamidine Neuropathy, with Reference to the Retention of the Drug in the Body. *Ann. Trop. Med. an Parasitol.*, 43(1):4-12, 1949.

†Fairbairn, H., Culwick, A. T., and Gee, F. L., A New Approach to Trypanosomiasis. *Ann. Trop. Med. Parasitol.* 40:421-452, 1946.

Postvaccinal Reactions In Man And Animals**

By L. E. STARR*, D.V.M., Ph.D.
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RABIES has been with us for centuries, having been mentioned by Homer, Aristotle, Plutarch and other ancient writers. Pasteur originated the use of fixed virus nerve tissue as a prophylactic agent but the product was new, immunological principles were not well understood and bad results were occasionally obtained. It is possible that in some instances the virus was not properly attenuated, particularly with workers other than Pasteur, and that rabies actually resulted occasionally following the use of cord or brain tissue vaccine. Pasteur was severely condemned by his enemies and critics and was accused of causing *rage de laboratoire* or rabies in the laboratory. In spite of refinements and great improvement in the methods of preparation and administration of antirabic vaccine, the product is not entirely safe either in man or animals.

By postvaccinal accidents we refer only to those nervous disorders occurring during or following administration of antirabic vaccine, either according to the multiple injection method employed in man or by single or multiple injections in the dog. Such accidents while varying in degree of intensity, with recovery in most cases, must be ascribed to the treatment itself and to have no connection whatever with rabies virus. Clinical rabies caused by fixed virus may therefore be excluded from the discussion.

Pasteur's original vaccine was made from the dried cord of rabbits which had been injected intracranially with fixed virus. Brain tissue was later substituted for the cord and all present day vaccines for both human and animal use are now prepared from the brain or brain and cord of animals; rabbits, sheep, goats or horses infected with fixed virus rabies.

Brain tissue when injected acts as a foreign protein and as such may stimulate the production of specific antibodies with the result that a few of the recipients may be more or less sensitized to the specific protein. Subsequent injections of the same protein occasionally result in protein shock or reactions which are commonly known as postvaccinal reactions or accidents. These reactions usually occur in man following sensitization from a previous series of treatments but they may occur during or following the initial series.

The same general pattern is observed in dogs as in man. Most dogs which manifest a reaction to the vaccine have a history of a previous treatment but some animals react following a single dose with no previous sensitization. Large numbers of cattle, horses and mules are given prophylactic treatment in Georgia but no reactions of any nature have been reported nor observed by the author. Large animals are given 30cc to 100cc in single or divided doses on alternate days.

The concentration of brain tissue in the vaccine for human use and the total amount injected varies with different laboratories. We have used a modified Hoegyes dilution method in preparing our human antirabic vaccine. This consists of fixed virus rabbit brain emulsified in a glycerine-saline solution in a concentration of one brain (approximately 10gm) in 1500ml of diluent or a 1:150 dilution. Phenol is added to make a final concentration of 0.5% as a virostatic agent. This vaccine contains living attenuated virus.

Veterinarians Frequently Exposed

Veterinarians in areas in which rabies is endemic or epizootic are not infrequently bitten or otherwise exposed to rabid animals and many of them have taken one or more series of Pasteur treatments. Such individuals present a considerable hazard to themselves in case of subsequent exposure necessitating further treatment.

In the light of present experience, administration of antirabic vaccine is definitely indicated in man following a bite by a rabid or presumably rabid animal. It is also advisable as a prophylactic measure in dogs, cattle, horses and mules in areas in which rabies is known to exist. However, we should be familiar with the dangers attendant upon such treatment and methods of prevention, both in man and animals.

The actual prevalence of various types of reactions to antirabic vaccine is difficult to determine. It has been variously estimated that one in 3000 to one in 500 human patients receiving Pasteur treatment develop some degree of paralysis. It is probable that reactions with-

**Presented at the Oklahoma Conference for Veterinarians, Oklahoma A. & M. College, Stillwater.

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out paralysis are much more frequent than statistics indicate but are not reported or not recognized.

Since 1925, in Georgia we have encountered seven cases of treatment paralysis among approximately 55,000 persons treated, or a ratio of 1:7854. In this series of seven, there were four deaths, a mortality of 57% of those affected.

Reliable data with respect to dogs is unobtainable at present, but observations by the author over the past four years indicate that the incidence of some degree of paralysis in dogs and the mortality is probably considerably higher than in man. Virtually nothing is known concerning the occurrence of mild or nonparalytic reactions in dogs. It is probable that they occur but if so, are transient in character and are either not recognized, or not associated with antirabic vaccine and therefore not reported. It is also possible that any reaction to the vaccine is much more severe in dogs than in man because dogs from five to 50 pounds in weight receive five to 10cc of a 20% suspension of brain tissue in one dose. This is many times the dosage per pound of body weight employed in man and many such dogs are already sensitized by previous treatments.

Symptoms in Man

Sellers[1] has described the nature of reactions encountered in man as follows:

"Repeated injections of antirabic vaccine may bring about varying combinations of local and systemic reactions ranging from immediate circumscribed erythema and swelling at the site of injection to immediate or delayed urticarial rashes often accompanied by fever, malaise and swelling of the joints. As a rule, reactions of this nature are not dangerous and do not contraindicate the completion of the prescribed series of injections.

"However, there is another type of reaction which specifically affects the nervous system and manifests itself in several ways, ranging from a simple neuritis to a profound encephalomyelitis and paralysis. Three types are recognized:

"1 *Peripheral Neuritis.* This is a rare type of reaction and more apt to occur during the latter part of the treatment. There may be a rise in temperature. The symptoms are referable to the facial nerve. Further treatment should be discontinued at once regardless of the severity of exposure.

"2. *Dorso-Lumbar Myelitis.* Characterized by fever, gradually increasing weakness, numbness and tingling of the extremities, sphincter disturbances and, within two to four days, more or less complete paralysis of the extremities, especially the lower. This syndrome usually begins after the tenth to twelfth day of treatment, and unless death intervenes due to cardio-respiratory complications, may last for several weeks. Complete recovery is the rule. Needless to say, at the first sign of this type of reaction, treatment should be stopped at once.

"3. *Paralysis of the Landry Type.* This is similar to Type 2, but more severe and acute at onset. It is ushered in by nausea, vomiting, girdle pains, headache, fever, retention or incontinence of urine, and an ascending paralysis of the extremities. The paralysis may ascend to involve the bulbar nuclei, and death from cardio-respiratory failure may occur. The mortality rate is high (30 to 50%). Some persons recover completely, while others are left with varying degrees of paralysis."

For the benefit of veterinarians it might be well to cite the experiences of three Georgia veterinarians, all of whom have taken Pasteur treatment one or more times and have experienced more or less severe reactions following or concurrent with the last series. The reactions, noted below, were non-nervous in character; however, experience indicates that continued treatment might have resulted in serious nerve involvement.

During the past several years C.R. has taken Pasteur treatment nine times. The last two series had to be discontinued after a few doses because of severe swelling, hyperemia and pain at the site of injection. This local reaction appeared within one-half hour after the injection. This was followed by some abdominal pain and extensive edema under his eyes, in his fingers and ankles. The reactions disappeared in about two days after discontinuing treatment. He should never receive any more injections of rabbit brain tissue vaccine.

H.B. has had three series of Pasteur treatments with some reaction during the last series. In 1948, he suffered a mild bite by a clinically rabid dog. Four doses of vaccine were furnished by the health department with the request that not more than that number be used and that treatment should stop with the appearance of any reaction. The first injection was made in his right arm and in a few hours the middle finger of his right hand showed some numbness followed by inability to move it voluntarily. The second treatment was given in his left arm and was followed by the same condition in his left middle finger. The third dose was given in the abdominal muscles. This injection was followed by general malaise, and severe abdominal, muscle and joint pains. He was confined to bed for three days and made

an uneventful recovery. He was in considerable danger and it is highly probable that another injection would have caused serious complications. Regardless of the severity of any future exposure he should not risk rabbit brain tissue antirabic vaccine.

F.D. took the customary Pasteur treatment of 21 doses, in 1928 and again in 1934. In October 1948 he was bitten by a rabid dog and treatment was started again. The first injection in his abdomen was followed by a severe hyperemia with intense itching at the site of the injection. The second and third injections were given in the buttocks and the remaining injections in his arms. In each instance reactions followed but not as severe as the first. Injections were discontinued with the sixth dose. On the ninth day following the initial injection he experienced a general burning and itching reaction with headache and edema of the hands and eyes. Edema later involved his throat so that he could not swallow. The latter was mistaken at first for symptoms of rabies. On examination at the hospital his throat was found to be completely closed by edema of the tissues. Recovery occurred in about three days although the itching still persists and he cannot tolerate hot water baths.

Rabies Hysteria

Rabies hysteria is a mental condition brought on by fear following fancied or real exposure to a rabid animal. In many instances this fear is exaggerated by the kindly solicitude of friends and relatives or by others describing, with all its gruesome details, the death of a person with rabies. A classic example was a young veterinarian, T.R., who answered a call to see a mule with indigestion (owner's diagnosis). On approaching the animal's head it suddenly snapped his hand, lacerating his fingers with its teeth. A provisional diagnosis of rabies was made which was confirmed the next morning. Word of his exposure spread rapidly and the common salutation on visiting a client was, "Heard you was bit by a rabid mule, Doctor. How are you feeling?" Constant repetition of this, plus the fear that the vaccine would not protect him, resulted in a complete nervous breakdown which was cured by six weeks in Florida. This is not in its true sense a postvaccinal accident, but rather a mental accident brought on by the knowledge that Pasteur treatment does not always protect the individual.

Symptoms in Dogs

Clinically the cases of postvaccinal reactions in dogs which have been observed by the author correspond roughly to the dorso-lumbar myelitis or paralysis of the Landry type in man. We have never observed any local reactions such as erythema at the site of the injection, urticaria or indications of general malaise and fever, although symptoms usually occur four to 15 days following injection and in most instances the animals have had one or more previous annual injections. We have had numerous reports of very rapid onset of paralysis and death within a day or so following antirabic vaccination. In every instance the animals had been disposed of before reporting them; therefore they cannot be reported here as authentic postvaccinal accidents. If the cases of death following onset of symptoms are true cases, the progress of the paralysis was undoubtedly very rapid with involvement of the cardio-vascular system and death. This is presumed and not proved.

We have had an opportunity to observe eight cases of postvaccinal paralysis in animals which apparently were authentic. Three of these were secured for examination, one of which died in transit and was in a bad state of decomposition on arrival. Of those observed, the onset of symptoms varied from four to ten days following vaccination. The appetite was impaired, and the animals showed various degrees of emaciation and muscular atrophy. Temperature, respiration and heart were normal. Partial or complete paralysis of the legs was the predominant symptom. There was partial or complete loss of sensation or pain in the affected parts. In part of the animals the paralysis was involving the front and hind leg on one side, in others it was bilateral, involving both rear legs or all four legs. Some animals were unable to rise but could stand after assistance in placing them on their feet but would fall over when they attempted to move.

These cases of incomplete paralysis usually recovered in three to six weeks. Animals which were completely paralyzed in all four legs rarely showed improvement, developed decubitous sores and pulmonary complications and died in a few days of cardio-respiratory failure. In all the cases observed the head and senses remained apparently normal.

Gross Pathology. The animals lose flesh rapidly and muscular atrophy of the legs involved was noted early. In recumbent animals decubitous sores are evident. The body organs are normal. The radial or the sciatic and tibial nerves, or both, depending on the legs involved, are light in color, greatly atrophied and show no cross striations.

Histopathology. Brain normal. The distal nerves show perivascular and perineural cuff-

ing, demyelinization and degeneration of the axis cylinder. The gross and histopathology is very similar to those found in human cases.

Etiology

Although various theories have been advanced in the past as to the cause of postvaccinal reactions, it is quite generally agreed at the present time that it is a true allergic reaction, due to sensitization to protein substances in brain tissue with the production of specific antibodies. This sensitizing factor can be removed, but the cost of such a refined product would be excessive. We must consider repetition of treatment as an acquired predisposing factor which should be avoided whenever possible.

The period of time between the sensitizing and reacting injections is extremely variable. Of the ten individuals referred to who experienced reactions, eight had previously received antirabic vaccine 14 months to 27 years before beginning the final treatment. There is possibly a quantitative relationship between the amount of vaccine given and the incidence of reactions as well as an individual idiosyncrasy on the part of certain people and dogs.

That sensitization does result from the use of rabbit brain tissue has been amply demonstrated. Injection of normal brain tissue will sensitize animals so that subsequent injections will result in the same clinical syndrome as previously described. The presence of rabies virus either dead or fixed is not in itself an etiological factor. Unfortunately, random histories on dogs are not entirely reliable because of the human factor, lack of positive information and satisfactory methods of identification. However, the histories of authentic cases investigated by the author of reactions in dogs indicate that in most instances one or more annual treatments had been administered prior to the reacting treatment. Even in those cases in which such a history was not obtained a minor natural exposure could have occurred some time in the past or a forgotten treatment may have been given. Postvaccinal reactions in man and dogs follow in the same sequence and are undoubtedly identical insofar as etiology is concerned.

Prevention in Man

When confronted with problems of rabies prophylaxis, the physician or public health official is often confronted with a serious decision because rabies is universally fatal and he cannot make an error and therefore frequently administers treatment when it is unnecessary and even at times dangerous to the client. This is particularly true when dealing with apprehensive or semihysterical patients.

By applying the following rules of procedure the danger may be greatly lessened: In most instances, biting dogs are not rabid. However, in all cases of human or animal exposure the dog should be confined for observation. Except in the case of severe lacerations of the face or hand by the dog's teeth, treatment should not be given as long as the animal remains normal. Never destroy a suspect dog. Let it die a natural death. Animals in the early period of rabies will invariably show characteristic symptoms in a day or two.

Veterinarians practicing in a territory where rabies is prevalent should use extreme caution in approaching any animal's head. Symptoms of indigestion are the most common early observation in horses, mules and cattle. Furious rabies usually follows within twenty-four hours. Perfectly docile dogs may be carried into the hospital in the owner's arms but will bite a stranger. In case of doubt, withhold treatment or administer medication by the hypodermic method and observe the animal the next day. Veterinarians should bear in mind that no one can diagnose rabies a day or so before onset of paralytic or furious symptoms but such animals will usually bite on the slightest provocation.

Prophylactic treatment is not indicated for exposure other than actual or suspected bites or scratches by the teeth of the suspected animal. In our experience we have never had a case of rabies develop where the exposure was known to be other than an actual bite. In these cases of mild exposure, the danger from complications following treatment is greater than the danger of rabies developing. Treatment should not be administered when a person is bitten through the clothing if the cloth is not torn. Contamination of the hands with saliva from a rabid animal is a frequent occurrence but if the skin is not broken and, particularly, if the person has washed his hands with soap and water soon after the exposure, there is no danger and treatment should not be given.

In all cases of mild exposure in which the person has had treatment some time previously, no treatment is indicated except for psychological reasons and then they should be limited to four to six injections.

Above all, if there is a history of previous treatment, further treatment should be avoided, or limited to a short booster dose of less than ten injections. Even so, at the first sign of a systemic reaction such as tingling of the extremities, girdle pains, headache, nausea and

fever, treatment should be discontinued immediately. Even marked local reactions should be regarded with suspicion.

Sterilization of claw or teeth wounds with acids or cauterization is not recommended. Thorough cleansing of the skin and wound with hot soap and water is more effective, the tissues are not further damaged, healing is not retarded and the formation of excessive scar tissue is avoided. The raw soap should be rubbed deep into the wound.

Prevention in Dogs

Under our present system of immunization, based on annual vaccination of dogs with brain tissue vaccine, there is no practical method of preventing postvaccinal accidents in these animals. As long as annual vaccination is necessary a certain percent of the animals will become sensitized by previous injections and a few of them will show some degree of reaction at subsequent injections.

Some recent advancements in the research field show promise of the development of new immunizing agents which may eliminate the danger to man and dogs in rabies prophylaxis.

Laboratory methods for removal of the protein element responsible for postvaccinal reactions are known and in all probability allergic-free antirabic vaccine for human use will be available in the near future.

Ultraviolet irradiated rabies vaccine is being prepared and used commercially for immunizing dogs. As an immunizing agent it is equal to and possibly superior, when properly prepared, to chemically killed vaccine. However, it is prepared from brain tissue and is potentially just as dangerous from an allergic standpoint as any other.

The latest development, which also offers the greatest promise, is the avianized chick embryo vaccine. The strain of virus employed has been thoroughly fixed by repeated passage in the brain of day-old chicks followed by approximately 130 chick embryo passages. In becoming avianized, the virus has been altered in its characteristics from a neurotropic virus to one pantropic in character. This virus grows profusely throughout the embryo and the entire embryo is used in the vaccine without further treatment or use of chemicals. The vaccine contains living attenuated virus.

Enough experimental work has been done to insure that the product is safe from the standpoint of reproducing the disease and that dogs, rabbits, mice and hampsters are rendered solidly immune. Dogs injected with the chick embryo vaccine remain resistant against severe challenge doses with street virus after two years. This product, prepared entirely from embryonic tissue, which in itself is very slightly antigenic, has very little brain tissue in it. It should not therefore produce protein sensitization and no reaction should result. If the chick embryo vaccine produces a lifetime immunity, only one treatment will ever be given, so sensitization whether present or not, will be of no concern. It is probable that this, or a similar product, will be developed for human use thus obviating the use of a series of injections with brain tissue as now practiced. We have a field trial in progress in Georgia in which we expect to immunize a minimum of 7000 dogs to determine the duration of the immunity produced. Progress reports will be made from time to time.

Another product which bears promise is hyperimmune serum. Hyperimmune serum has been and is still widely used in parts of Europe and Asia, particularly in India. Although of undoubted value in rabies prophylaxis, it has not been used widely in this country. Only last year we were given a supply of hyperimmune rabbit serum for experimental use. Rabbit serum is quite expensive but we are assured that an even better, as well as cheaper product, is being made from sheep. Curiously enough, a member of the staff of the Georgia Public Health Department prepared hyperimmune serum from sheep in 1907. This was used in a number of patients with favorable results but was discontinued for some undetermined reason. Hyperimmune serum is used in cases of severe exposure on the face or hands, exposure which may cause rabies when the incubation period is too short for the usual vaccine to be of value. To date we have used serum on nine human cases. None of the cases developed rabies and in only one instance did any reaction occur. In this case, a man had taken the Pasteur treatment in March 1949 and was exposed again in May. Administration of hyperimmune serum was followed by severe local reactions at the sites of the injections of vaccine given in March. With appropriate treatment the reaction disappeared with no further complication. This indicates that care must be exercised in the administration of rabbit hyperimmune serum to patients who have had injections of antirabic vaccine prepared from rabbit brains. A specific sensitization to rabbit protein with production of antibodies is apparent.

1. Sellers, T. F., Complications of Antirabic Treatment. *Jour. Med. Assn. Ga.*, Jan., 1947.

Veterinary Geriatrics*

By Arthur Trayford, D. V. M.
Huntington, N. Y.

"Old age is a tyrant which forbids the pleasures of youth on pain of death."

—Rochefoucauld.

HOW OFTEN have we heard these words? "Doctor, my dog is 12 years old, we know that he does not have much longer to live, but we would like to keep him as long as possible."

"Well, I am afraid that your dog is too old and there is nothing I can do for him, so I would recommend that you put him to sleep."

Doubtless all of us are confronted with this situation at least once or twice daily, unless we are fortunate enough to have a practice consisting only of young and middle-aged dogs.

It is indeed unfortunate that, in some instances, euthanasia for animals is an easy way to circumvent the issue of geriatrics. However, considerably more effort should be put forth in trying to establish diagnosis and treatment for those animals which have reached the stage of old age.

There is a great deal of satisfaction to be gained by keeping an aged animal in a state of health that will allow it to enjoy a useful and happy life, not to mention the confidence aroused in the owner by your ability to keep his old friend around for a few months longer. A client does not like to be told that it is impossible to do anything for his old dog. If you would like your client to take his old dog from doctor to doctor, until he finds one who will lend a sympathetic ear and attempt treatment, just remember to recommend euthanasia.

Before recommending euthanasia give the animal a thorough physical examination. Do not rush this examination, as it is well to remember you are passing judgment on an old friend or virtual member of the family. It is better to call in a consultant, than to make a snap diagnosis and cause your client to seek advice elsewhere. You will receive gracious thanks from your clients for your sympathy and will be on better terms with your colleagues.

The owner of an old dog considers the pet a member of the family and will usually take care of any obligation incurred in the lengthening of its life. Therefore, it is to the advantage of the practitioner to become more cognizant of the problems encountered in the handling and treatment of the senile patient.

A case or two will illustrate some of the problems encountered by the veterinary geriatrician. These cases will be somewhat hypothetical but we have all had similar experiences.

An 11-year-old dog, with the history of a slight cough, somewhat wheezy in nature, has been having difficulty in negotiating stairs. The owner has also noted spasmodic emesis of bile and water, usually occurring in the morning. There is reported a tendency toward constipation and difficulty in urination. The owner states the only reason he has brought the dog to you is because he has been told that the cough is caused by worms and he wants the dog "wormed". He needs to be told in a convincing kindly manner that such is not the case.

To gain as much information as possible concerning the case, not only must a complete history be obtained from the owner, but the patient should be given a thorough examination. In the examination of the eyes, there is often noted opacity of the lens, with failure of eyesight. The owner has probably noted the difficulty but when it is called to his attention he is grateful for your explanation. The animal's mouth should be examined for tartar accumulation around the teeth or evidence of dental caries. It might be suggested that dental correction and tooth scaling would add to the dog's general comfort. The condition of the coat and skin, considering age, should be noted. Examination of the heart probably will reveal valvular insufficiency which may be responsible for the wheeze and cough. A slight tenderness over the lumbar region may be the key to the cause of the difficulty in climbing stairs, the emesis occurring in the morning an indicator of nephritis. The latter supposition should be confirmed by urine analysis. Upon palpation of the abdomen the condition of the abdominal organs can be ascertained—possibly an enlarged prostate may contribute to the symptoms of constipation and dysuria.

Since some of the conditions mentioned are simply senile in character, the owner should be advised that all these conditions contribute

*Presented at the 58th Annual Meeting New York State Veterinary Medical Society in New York City, N. Y., June 22-25, 1949.

to the general ill health and must be considered in the treatment of the case. Processes involving many or all body organs and tissues illustrate the difficulties encountered in the medical care of the aged.

In a discussion of the treatment of these cases one must consider the direction of treatment to assist best in the adjustment of metabolic processes that are primarily embarrassed or are major contributors to the symptoms observed. The following therapeutic suggestions are made for the treatment of these aged pets.

Digitalis is employed in cases of cardiac muscular weakness, poor circulation and to improve the tone of the heart beat. In cardiac or valvular insufficiency associated with an asthmatic-like cough and wheezing, possibly due to circulation failure in the lungs, tablets of mannitol hexanitrate 0.5gr with 0.25gr phenobarbital (one-half tablet morning and night continuously) for a small terrier, frequently give sufficient relief to allow needed restful and undisturbed sleep at night.

Nephritis a Common Ailment

Diet plays a great part in the well being of all old dogs which should be limited in their protein intake. It is well known that many elderly dogs are in the early stage of nephritis or on the verge of it. Considerable difficulty may result from feeding these animals exclusively on one or more of the various types of prepared foods obtainable. However, a new prescription ration that is now being offered to pet owners is proving to be an easily digested diet for these elderly nephritics.

Medicinal treatment of the mild nephritic responds very nicely to the use of gentle diuretics together with a proper diet. A tablet which is a combination of methenamine, resorcinol and barosmin has proved useful in our hands. Another useful preparation is elixir of saw palmetto which is soothing, mild, and palatable.

A particularly trying type of case is the old Cocker Spaniel, with large eyes, eyelids drooping, chronic conjunctivitis, and marked injection of the scleral vessels. In these cases, a constant discharge from the eyes is accompanied by rubbing with resulting laceration of the eyelids. After trying many kinds of treatment for this condition, our favorite continues to be a five or 10% copper citrate ointment which can be used constantly in these chronic cases of conjunctivitis. Improvement occurs in a few days and continues until the conjuctiva becomes practically normal. This ointment can also be used in the treatment of corneal ulcers following cauterization.

Most Old Dogs Suffer Skin Disorders

In diseases of the skin of aged animals we have a real problem, since there are very few old dogs that do not have skin disorders some of the time. Many of these may be dietary in origin, such as lack of fat in the diet, too much protein, over-emphasis on carbohydrates, and certain food allergies. These conditions present numerous problems, but they must be approached with logic if they are to be solved with any degree of satisfaction to the practitioner and the client. Other skin diseases encountered may be the result of parasites, nonspecific dermatosis, fungus infections, furunculosis, acanthosis, alopecia areata and declining activity of endocrine system. In treating these conditions one may run the gamut of preparations and still not get results. In some of the old chronic skin cases, the addition of fatty acids to the diet may cause marked improvement, and testosterone may be given twice weekly for two or three weeks. This treatment, plus the elimination of external parasites and the local treatment of choice to allay scratching and injury to the skin in some cases, is all that can be done for skin affections in the senile dog.

Approach Surgery with Caution

All surgery on elderly animals should be approached with a great deal of caution. A thorough physical examination should be made before attempting a prognosis. It is very difficult to explain the loss of a patient if a good prognosis has been given after a careless examination. Anesthesia should be well chosen and well supported by respiratory stimulants such as metrazol or coramine. Warmth supplied to the body during and after surgery is often the determining factor of successful recovery. All major surgery should be supported by the administration of fluids before and after surgery. Plasma or whole blood should be used where hemorrhage has been excessive to prevent shock and restore normal b'ood pressure.

Healing is slower in aged patients, but if the body nutrition is up to par this is not a serious factor. Old patients are found to be more tolerant toward a healing wound and since they do not bother it, recovery is more rapid.

For anesthesia, a combination of morphine and atropine, followed in an hour with pentothal sodium or pentobarbital sodium to effect, is successful. Sometimes demerol is used

(*Continued on Page* 518)

Clinical Reports

Acute Metritis in a Dog

A seven-year-old, blonde Cocker Spaniel female was presented, with a history of having whelped two days previously. The animal appeared depressed and upon palpation over the region of the uterus exhibited symptoms of pain. The vulva was warm to the touch and excessively swollen. A dark viscid, putrid discharge was observed in the vagina and on the lips of the vulva. The temperature of the animal was 106.5° F.

A diagnosis of acute metritis was made and later confirmed by the isolation of a virulent culture of *Streptococcus pyogenes* obtained by swabbing the vaginal cavity. Urinalysis showed a four plus albumin, a positive test for blood and a large number of tube cast, epithelial cells, and blood cells in the sediment test.

Daily blood examination showed a very interesting blood picture, which changed correspondingly with the condition of the animal. The accompanying graph illustrates very definitely three different phases in the animal's condition.

A. Invasion Phase
   (1) High stab count (increase in production of polys)
   (2) Lower segmentor count, but gradually increasing as the cells mature.

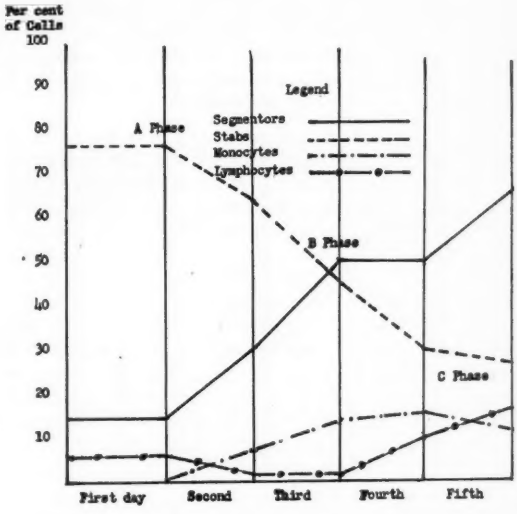
B. Defense Phase
   (1) Decrease in stabs, showing a decrease in the production of neutrophiles.
   (2) Increase in monocytes

C. Recovery Phase
   (1) Increase in lymphocytes
   (2) Continuing decrease in stabs, denoting a further decrease in neutrophile formation.

Treatment of the condition consisted of the following:

1. Initial administration of 300,000 units of penicillin (procaine in oil), followed by daily administration of 150,000 units for two days.
2. Streptomycin, 2cc (21gr) for five days.
3. Sulfamerazine, 14gr for two days.
4. Thiamin (1cc) and methenamine (10gr) on the third day along with bismuth subnitrate (5gr).

The animal responded very favorably and promptly to the above treatment. On the second day of treatment the temperature of the animal was down to 104.0° F. from the high of 106.5°. The third day the temperature was back to normal and the animal was eating well and showing signs of well being. The bitch was released from the hospital on the sixth day.



The progress of an infection can be followed with an accurately made, daily blood examination. In this particular case, the blood picture was in agreement at all times with clinical manifestations of the animal, and illustrates the value of an accurate blood picture.

JAMES B. POOLEY, D.V.M.
St. Joseph, Mo.

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Successful Reduction of Diaphragmatic Hernia Without Use of Respiratory Equipment

A male Collie pup five months of age was hit by a car about two hours before being brought to our hospital. A diagnosis of diaphragmatic hernia was made after close observation of the patient, which showed symptoms of dyspnea, reluctance to move, uneasiness, and a grunting sound on inspiration.

Surgery was advised. The owner was informed of the seriousness of the vital surgery.

Operative Procedure

The patient was restrained on the left side and prepared for an exploratory laparotomy. An area on the right side, extending from the tenth rib posterior to the middle of the abdo-

men and from the median line of the abdomen to within two inches of the transverse processes of the vertebra, was scrubbed, shaved, and disinfected. Sodium pentobarbital anesthesia was administered to effect intravenously, via the radial vein. An incision was made into the adbominal cavity one-inch posterior to the last rib and extending from within three inches of the transverse process of the first lumbar vertebra downward six inches towards the median line of the abdomen. The incision was spread apart with retractors, and an examination made for a tear in the diaphragm.

A loop of the duodenum was found to be extending through a tear in the diaphragm one-inch from the ribs and about two inches dorsal to the attachment on the abdominal floor. The intestine was withdrawn slowly from the thoracic cavity and just as the last bit was withdrawn the surgeon placed his index finger into the hole. The tear was then sealed with a series of hemostats to hold the edges in tight apposition. Just before the last hemostat was applied, pressure was placed on the thorax to expel any air which might have gained entrance into the thoracic cavity in an effort to maintain the intrathoracic negative pressure.

A double row of twenty-day chromic catgut suture material was used in closing the ruptured diaphragm. The first row consisted of continuous Lembert sutures. As this row of sutures was placed, the hemostats were removed in order, as every two sutures were placed and drawn tight. The second row of sutures consisted of interrupted Lembert sutures. Both rows started and ended about one-half inch beyond the end of the tear. After the last row of sutures was placed, a 20cc glass syringe and 22-gauge three-inch needle were used to withdraw any air which had gained entrance into the thoracic cavity. The abdominal incision was closed by suturing the peritoneum, muscle, and skin separately. Cotton suture material and interrupted mattress sutures were used in closing the skin incision. A sterile pack was applied to the area and it was bandaged.

After-treatment consisted of placing the pup in a warm place until he recovered from the anesthesia, and feeding a light soft diet of warm milk and pablum for five days. After the fifth day he was placed on a light diet of meat and dog food until released to the owner. The pup seemed to have difficulty in breathing for the first three or four days, but this had all disappeared by the end of the fifth day. The skin sutures were removed on the fifth day.

Recovery was uneventful and he was released to the owner on the tenth day after his entry into our hospital.

I had the opportunity to observe this same pup about a month later, when he entered our hospital as a boarder. The hair had just about all grown in, and the line of the incision was hardly discernible. The pup was normal in all respects and had to all appearances recovered completely from the operation.

JOSEPH W. BREDBENNER, D.V.M.
Berwick, Pennsylvania.

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Urethral Stenosis in a Cat

A nine-year-old castrated male cat was presented for treatment with a history of dysuria and anorexia which the owner said was recurrent in nature. The cat was in good general condition but showed a slight increase in pulse and respiration. Upon palpation, the bladder was found to be greatly distended but urine

Radiographic shadow of distended bladder. Inflammatory changes with thickened wall and concentrated urine produced clear definition of the bladder on the x-ray plate.

could be expelled by a gentle even pressure. Urine was turbid and dark. Microscopic examination revealed a few red blood cells.

A diagnosis of chronic cystitis was made and methenamine 5gr night and morning prescribed. The owner called the following week and reported the cat in normal health and eating well.

Ten months later the cat again refused to eat and appeared restless. Frequent attempts at urination were also described by the owner,

having persisted for several days. The bladder was found to be distended and very painful when pressure was applied. An attempt to pass a catheter through the urethra failed and due to the abnormal consistency of the bladder, it was deemed advisable to *x*-ray the bladder. The definite shadow of a widely distended bladder was the only pathology observed. Diagnosis, urethral stenosis.

The owner was advised that surgery would be necessary to determine the nature and extent of the urethral obstruction. He chose to have the cat destroyed and gave us the privilege of performing autopsy. The bladder was found to be filled with a dark stagnated urine; cystic calculi were absent. The mucosa was greatly thickened and pale. The stenosis was due to fibrosis of the urethra just posterior to the neck of the bladder. It entirely encircled the lumen at this point, leaving only a very small opening for the urine to pass. No urethra calculi were found but the stricture of fibrous tissue was probably due to some long standing irritation, which in this case could have been a calculi which had become dislodged and later passed.

WARREN G. SWIFT, D.V.M.
Fort Smith, Arkansas.

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Obscure Lesion of Actinomyces

A yearling Hereford steer in good condition presented symptoms of slight incoördination of movement, with the head held laterally to the right. The temperature was normal and the animal appeared alert and bright.

The owner reported the steer had been on pasture and had been eating and drinking normally. This animal was one of several that were to be put in the feed lot. Infection in the right ear was suspected by the owner. Careful clinical examination did not disclose any abnormality and the case was tentatively classified as a central nerve disturbance.

Since the steer was in apparent general good health, slaughter was advised. Close postmortem examination did not reveal any pathology in the carcass. When the head was sectioned and the brain removed, the sphenoid bone was observed to be thickened in an area about two inches in diameter, causing pressure on the brain. Laboratory examination showed the typical ray fungus appearance of *Actinomyces bovis*.

Since there was no evidence of metastasis, the head was condemned and the rest of the carcass passed for food.

FRANK J. FISHBURN, D.V.M.
Medicine Lodge, Kansas.

Ascites in an Aged Dog

That ascites may result from any circulatory failure was well illustrated in the case of the aged Collie presented for treatment after several weeks of noticeably increasing abdominal distention.

Symptoms other than the evident ascitic condition were the shallowness of breathing, apparent cardiac insufficiency, difficulty of movement to near collapse, and general symptoms of senility.

On abdominocentesis, approximately 8000cc

of a blood stained serum were drawn—allowing one hour for the operation.

Treatment included daily oral doses of digitalis and a low residue nutritious diet. The animal succumbed within a few days after admission to the hospital.

On necropsy, the primary and causal lesion was determined to be failure of proper function of the right ventricle of the heart, which was tremendously enlarged. Complete failure of cardiac function was the immediate cause of death. Lowered efficiency of circulation is considered to be the etiological factor of the dropsical condition.

E. J. FRICK, D.V.M.
Manhattan, Kansas.

Book Reviews

MODERN DRUG ENCYCLOPEDIA AND THERAPEUTIC INDEX. Edited by *Marion E. Howard,* M.D., F.A.C.P. Fourth Edition. 1283 pages. Drug Publications, Inc., New York, Publishers. Price $12.00.

The fourth edition of this massive work treats of upward of 3500 drug and drug preparations, biologicals and allergens, offered for the diagnosis and treatment of disease. The text material as set forth in the foreword has been completely rewritten and reset to contain the newest preparations considered to be therapeutic advances in the field of human medicine.

The first 956 pages are given over to pharmaceuticals listed alphabetically. The manufacturer and the general classification of the preparation is given, together with brief statements under composition, description, action and uses, administration, and supply.

Three indices are provided; a general index, an index by individual manufacturers and an index of therapeutic indications. All are cross-indexed for easy access to any specific drug or biological listed.

Modern Drug Encyclopedia may serve a limited purpose of the veterinary practitioner mainly as a reference to available agents useful in the treatment of pet animals.

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NUTRITION OF THE DOG, by *Clive M. McCoy,* Professor of Nutrition, Department of Animal Husbandry in Cornell University. Second Edition. 337 pages, 56 tables, 47 illustrations and drawings. Comstock Publishing Company, Inc., Ithaca, New York, 1949. Price $3.50.

The author states in the preface of this well presented work that its purpose is to improve the health of his favorite pet. To accomplish this, applied knowledge in the use of various food elements in the canine diet is given, followed under each division by more complete technical information. Each chapter contains a carefully selected reference list for the benefit of those who wish to further delve into the intricacies of nutrition. With this arrangement a large number of readers are attracted, including the veterinarian as well as the dog owner.

It is not a nutrition primer by any means, contains no set formulae or diet recommendation, nor does it contain a daily menu for the house pet. It does treat in a sensible and understandable manner the values of essential elements in the diet of dogs and the best sources of supply. Citations throughout the text refer to experimental studies that demonstrate the role of individual nutrients and their interdependence.

For illustration we quote in part from the chapter on Carbohydrates for Dogs. "For many years the question of the digestion of raw starch by dogs has been debated. Men and dogs can digest some raw starch, but they usually develop diarrhea if they eat much of it. This is due to the passage of considerable amounts of raw starch into the large intestine, where it is fermented, with the evolution of gas. Many farm dogs eat raw starch when they steal feed from the chickens and seem to suffer no ill effects.

"As a rule, starch should be well cooked for dogs. In the Far North the corn meal fed to sled dogs is well boiled to form mush. Likewise, wheat flour must be boiled or baked."

Composition of common foods fed to dogs is given in a series of tables. Requirements for growth, reproduction, and lactation are discussed. A chapter by Dr. Robert Udall treats of parasites and their control in the light of animal nutrition. Nutrition of the Dog embodies much of the total of essential useful information developed from canine nutrition studies. It should prove a valuable addition to your library and a worthwhile treatise to recommend to interested dog owners.

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Veterinary Geriatrics

(*Continued from Page* 514)

in place of morphine where emesis is undesirable. Local anesthetic should be employed where possible.

Remember that senility is not a disease but a perfectly normal physiological condition. A state of good health, in consideration of age, is the goal of our therapeutic or surgical efforts. The science of geriatrics has the double objective of enabling our patients to live longer comfortably and at the same time to get more out of that living.

To quote Dr. C. Ward Crampton, an eminent specialist in human geriatrics: "An individual ages in whole and he ages in parts. Organs age unevenly." He goes on to cite the case of a 60-year-old man who may have a 40-year-old heart, 50-year-old kidneys and an 80-year-old liver, who may be trying to live a 30-year-old life.

Veterinary Problems in Poultry Production

By W. R. HINSHAW, D.V.M., Ph.D., Frederick, Maryland

According to Maits (*Country Gentleman*, 119:58, Sept. 1949), a system has been worked out by the U.S.D.A. Research Center, Beltsville, Md., which will permit shipping only fertile hatching eggs. This is accomplished by preincubation of the eggs for 18 hours, for chicken eggs, and 24 hours for turkey eggs. They are then candled and the infertile ones removed. The good eggs are then chilled to 50° to 55° F. for a minimum of two hours to stop embryo growth, after which they can be shipped to hatcheries for further incubation. M. W. Olsen, U.S.D.A. poultry specialist, believes that preincubation can save a lot of the shipping and handling charges for the 15% of the hatching eggs that are now shipped as infertiles. Olsen has shipped "arrested" chicken eggs as far as Des Moines, Iowa, and had them returned to Beltsville for continued incubation, and has had a hatchability of 80% of all eggs originally put in the incubator.

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The income from sales of eggs and chickens (including home consumption) for last year totals to a gross of $3,272,708,000, according to figures released from U. S. Bureau of Agritultural Economics. This is a new all-time record high. About 66% of this came from eggs, 22% from farm chickens and 12% from commercial broilers.

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According to Dr. George F. Stewart, *(U. S. Egg and Poultry Magazine*, 55:10 (June) 1949), pasteurization developed during World War II, will soon be generally accepted by egg processors as the means of preparing eggs and egg products for storage.

As a result of experimental work done at Iowa State College and Ohio University, the following temperatures and holding times are recommended in pasteurizing liquid egg products:

Liquid whole egg—142°F. for three minutes.

Liquid yolk—142°F. for two minutes.

Liquid white—134°F. for less than one minute.

These temperatures and times will generally kill more than 99% of all bacteria in egg products and will generally eliminate all coliform and similar organisms. According to Stewart, pasteurization under these conditions will have little or no adverse effect on the culinary properties of egg products.

It is of interest that egg albumin could be pasteurized at a lower temperature than the yolk or whole egg. This was an important discovery because egg white is much more susceptible to heat damage than either whole egg or yolk.

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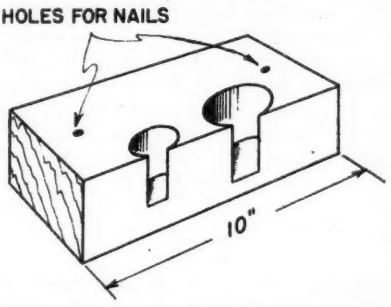
Dr. D. E. Davis has many time-saving and convenient gadgets which aid him to handle more efficiently his large poultry practice in Petaluma, California. The vaccine bottle holder illustrated in the accompanying figure is an example. It consists of a wooden block, 2″x4″x10″ with holes for holding the bottles



drilled in the edge of the block so that the contents can be viewed through the window. Nail holes are drilled in the block to facilitate securing it to the table. Quoting Doctor Davis, "This is a handy gadget . . . It prevents wasting of vaccine and also makes it possible to see that the needle or brush actually picks up a dose when the bottle is about empty. When the bottle is almost empty, one may put a little packing in the hole in the block and tip the bottle to get the last drop of vaccine."

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In ventilating a laying house during the winter months, consideration must be given to the water of evaporation given off by the birds themselves, (Jull, *World's Poultry Sci. Jour.* 5:28, 1949). At 50°F., 100 birds averaging four pounds each will exhale about 12 pounds of water daily. In one month, under prevailing temperatures in most houses during the winter months, 100 birds will eliminate about 350 pounds of respiratory water. In addition to this, the water eliminated in the droppings will average 1000 pounds per 100 birds per month. Thus, 100 birds will eliminate 1350 pounds of water per month, which must be considered in planning a ventilation system.

You'll Be Interested to Know That . . .

"Juvenile Jury" Back on the Air October 2

"Juvenile Jury", Gaines Dog Foods' mirth-making program of youngsters who solve children's problems, returned to the air for its fourth consecutive year on Sunday, October 2, it has been announced.

The show will be heard on a Mutual network of over 200 stations each Sunday from 3:30 to 4:00 P.M., Eastern Standard Time.

The format of the riotous novelty show remains the same. Each Sunday five alert youngsters making up the "Jury" are presented with questions submitted by listeners. The sharp wits of the "Jury" panel set a swift pace for this unrehearsed show in which "anything can happen", and usually does. A special feature is the purebred "Dog Guest of the Week." Here the jurors attempt to identify the breed, origin and special qualities, but if they fail to do so they are given the facts by emcee Jack Barry, creator and originator of the show, who continues to handle the youngsters in his own inimitable style.

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Research men at the Jackson Memorial Laboratory, Bar Harbor, Maine, are using radio in diagnosing the behavior and physical condition of dogs. While the dog runs free in the lot, a battery-operated radio transmitter, strapped to him by means of a shoulder holster, broadcasts the heart beat and respiratory rate. Under these circumstances, the dog's emotional responses are more natural than when he is held down for examination.

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Dr. J. E. Mosier (K.S.C. '45), formerly assistant professor, Kansas State College, School of Veterinary Medicine, has been appointed assistant professor of veterinary clinical medicine, University of Illinois, College of Veterinary Medicine.

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Ground-breaking ceremonies for the new Sharp & Dohme $4,000,000 Medical Research Laboratories at West Point, Pa., were held late last month. The building, to be constructed of brick and steel, when completed will be four stories high and contain 110,000 square feet of floor space. The building will house various research departments and will include an auditorium seating 250 persons and a large reception room for visitors.

M. K. Jarvis Joins Corn States Serum Company

Dr. M. K. Jarvis, practitioner of Beatrice, Neb., and former instructor on the faculty of Colorado State College, was recently added to the scientific staff of the Corn States Serum Company in Omaha where he will work with Dr. C. C. Foulk on canine distemper and swine erysipelas products. Doctor Jarvis was graduated at Kansas State College with the class of 1940.

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Dr. Don I. Skidmore, U. S. Department of Agriculture veterinarian, has retired after more than 44 years of service with the Bureau of Animal Industry, the Department announced recently. Doctor Skidmore was in charge of the Division of Virus Serum Control at the time of his retirement.

When the Division of Virus-Serum-Control was established in 1920, Doctor Skidmore was placed in charge and held that position until his retirement. Doctor Skidmore is an authority on the preparation of veterinary biological products and has contributed to the development of improved methods of producing them.

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Wisconsin's Governor Rennebohn recently signed the newly-passed animal procurement law making possible delivery of dogs to institutions of higher learning for use in the advancement of scientific knowledge. This measure applies to some unwanted stray animals collected and confined by dog licensing officials. Reasonable time is allowed to the custodian of a dog pound to find the owner of the dog, if an escaped, owned animal.

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Dr. H. J. Rollins, of Rockingham, has been appointed as State Veterinarian of North Carolina to succeed Dr. L. J. Faulhaber, who retired on July 8.

As Director of the Agriculture Department's Veterinary Division, Doctor Rollins will have supervision over enforcement of state laws regarding the control and eradication of livestock and poultry diseases.

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Dr. M. L. Willen, OVC '46, has opened a hospital under the name of Greenacres Animal Hospital, at Canton, Ohio.

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International coöperation, in fighting animal diseases, has become a "must do" in the face of famine-producing plagues and such constant perils as anthrax, tuberculosis, brucellosis, rabies, and a whole array of other threats to human health and industrial progress that yield only where veterinarians step in to control them.

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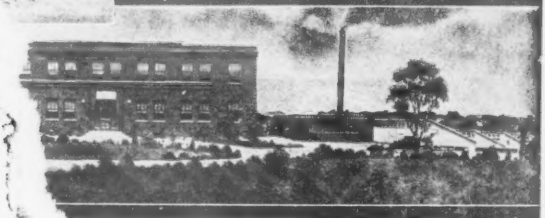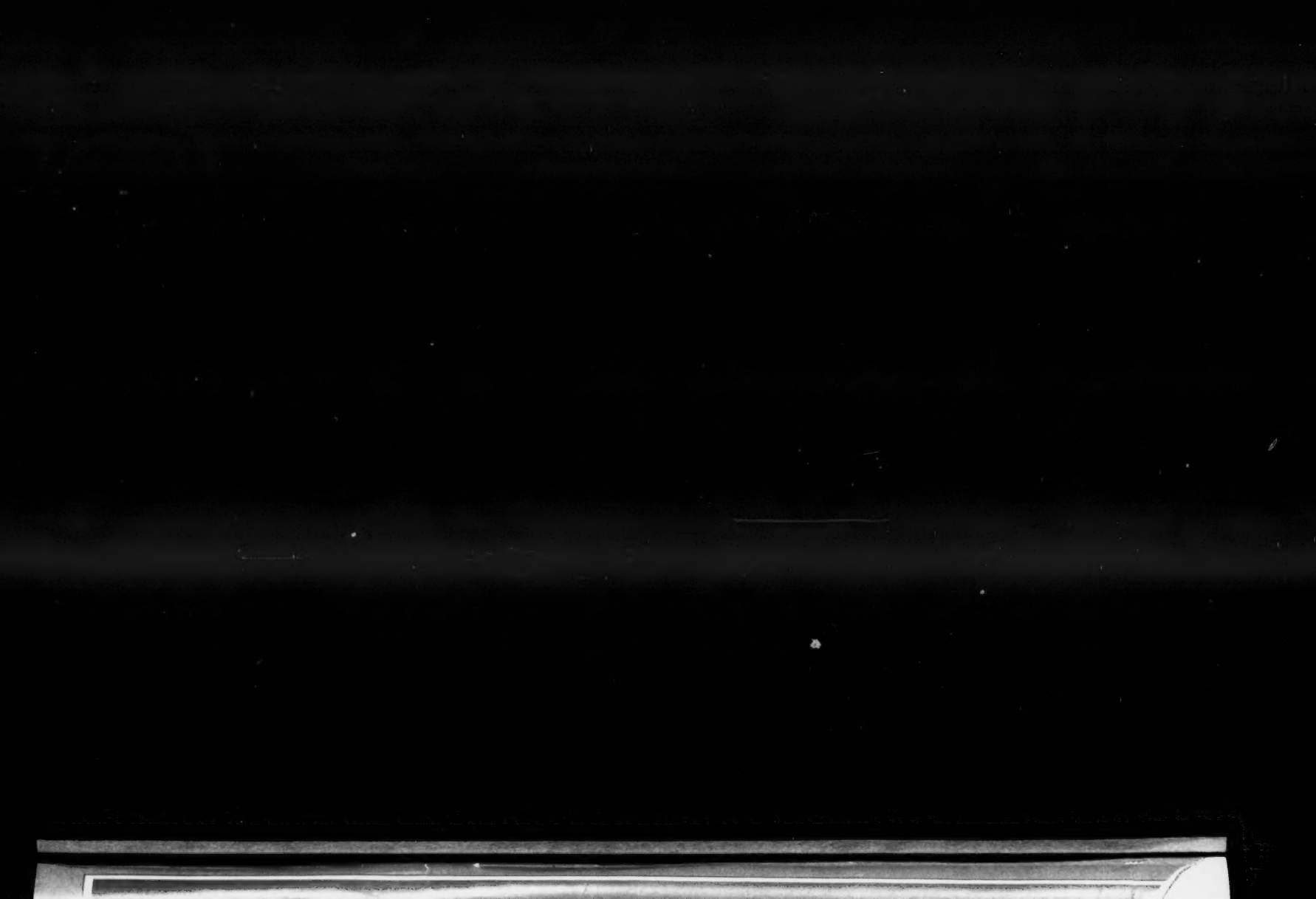
THE FACT THAT THE WHOLE WORLD IS BEGINNING TO COMPREHEND THE FUNCTIONS OF APPLIED VETERINARY MEDICINE MUST BE QUITE A DISAPPOINTMENT TO THOSE WHO FLOUT THE VIRTUE OF COLLEGE-TRAINED GUARDIANS OF ANIMAL HEALTH.